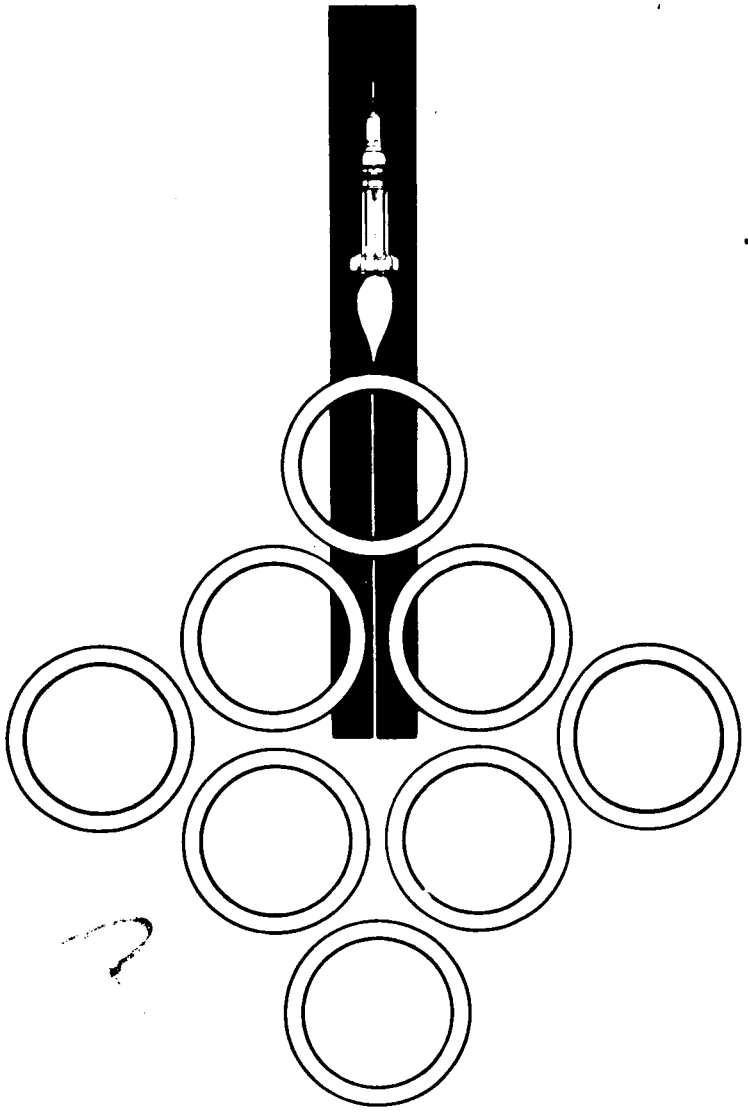

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Saturn I

LAUNCH VEHICLE SA-8 AND LAUNCH COMPLEX 37B FUNCTIONAL SYSTEMS DESCRIPTION

Volume IV

NITROGEN AND HELIUM STORAGE FACILITY FUNCTIONAL DESCRIPTION, INDEX OF FINDING NUMBERS, AND MECHANICAL SCHEMATICS

SPACE DIVISION CHRYSLER CORPORATION

SDES-64-414

SATURN I
LAUNCH VEHICLE SA-8
AND
LAUNCH COMPLEX 37B
FUNCTIONAL SYSTEM DESCRIPTION

VOLUME IV
NITROGEN AND HELIUM STORAGE FACILITY FUNCTIONAL DESCRIPTION, INDEX OF FINDING NUMBERS, AND MECHANICAL SCHEMATICS

APRIL 1964

CHRYSLER CORPORATION SPACE DIVISION - NEW ORLEANS, LOUISIANA

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FOREWORD

This volume is part of a ten-volume set that describes the mechanical and electromechanical systems of launch vehicle SA-8 and launch complex 37B that function either during the prelaunch countdown or in the event of a launch abort. The mechanical and electromechanical systems of the launch vehicle that function during flight or flight abort are also described.

The ten-volume set is prepared for the Functional Integration Section, Systems Integration & Operation Branch, Vehicle Systems Divisions, P&VE Laboratory, MSFC, by Systems Engineering Branch, Chrysler Corporation Space Division under Contract NAS 8-4016.

This volume describes subsystems and components of launch vehicle SA-8 and launch complex 37B that make up the nitrogen and helium storage facility. The information is presented in three sections: functional description, index of finding numbers, and mechanical schematics. The technical content reflects the functional system design information available on March 1, 1964.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

SECTION 1

FUNCTIONAL DESCRIPTION

1.1 INTRODUCTION

The nitrogen and helium storage facility is the source of all gaseous nitrogen (GN_2) and gaseous helium (He) used in launch complex 37B and the SA-8 launch vehicle. The facility is comprised of two functional systems: the nitrogen system and the helium system. Figure 1-1 illustrates the storage facility in block diagram form.

The nitrogen system supplies 6000 psig GN_2 to the pneumatic control distributor (PCD) (volume V), 3500 psig GN_2 to the RP-1, LOX, and LH_2 control panels (volumes I, II, and III respectively), and 50 psig GN_2 to the environmental control system (ECS) (volume VI). The nitrogen system consists of a liquid nitrogen (LN_2) storage tank, four LN_2 pumps, four high-pressure vaporizers, a low-pressure vaporizer, two filter networks, and a GN_2 storage battery.

Three of the LN_2 pumps deliver LN_2 from the storage tank to the vaporizers at 6,000 psig; the fourth pump and its respective circuit remains on standby. The vaporizers convert the LN_2 to GN_2. The GN_2 is then filtered and routed at 6,000 psig to the GN_2 storage battery. GN_2 is distributed from the storage battery to the pneumatic control panels and PCD.

LN_2 at 65 psig is routed from the LN_2 storage tank to the low-pressure vaporizer. The 50 psig GN_2 output from the vaporizer is delivered to the ECS to provide a conditioned environment in the launch vehicle. The helium system supplies the pneumatic control distributor with gaseous helium at 6000 psig. The helium system consists of three compressors, a purifier system, and a He storage battery.

Gaseous helium is supplied to the system from supply trailers connected to the inlet lines. Helium at 2200 psig from the supply trailer tube bank is reduced to 120 psig and fed into the compressors where it is compressed, purified, and the output regulated at 6000 psig. The high-pressure output from the compressors is passed through a second purification-regulation stage and is then stored in the He storage battery.

1.2 NITROGEN STORAGE FACILITY COMPONENT DESCRIPTION

The functional relation of nitrogen facility components is illustrated schematically in section 3 and described in section 2. Several components are further described below.

1.2.1 LN_2 Storage Tank (Figure 3-1) - LN_2 Storage Tank A1150 is filled from an external source and has a capacity of 35,000 gallons. The tank supplies LN_2 at 65 psig to the reservoirs of the LN_2 pumps and to the low-pressure vaporizer. The storage tank is pressurized to 65 psig by drawing off and vaporizing part of the liquid, and returning the gas to the ullage section of the tank. Pneumatic Controller

A1188, pressurizing Flow Regulator A1190, Vent Flow Regulator A1185, and Vaporizer A1189 are the primary components used to pressurize the storage tank. These components control storage tank pressure as follows:

a. Maintain ullage pressure between 63 and 66 psig.

b. Vent ullage pressure exceeding 66 psig.

c. Provide additional pressurization below 63 psig.

Pneumatic Controller A1188 controls Flow Regulators A1190 and A1185 to maintain a nominal ullage pressure of 65 psig. The pneumatic controller samples ullage pressure and reduces it to a proportionately lower pressure to actuate the flow regulators. Flow Regulators A1185 and A1190 are pneumatically actuated valves controlled by the difference in pressure between two input lines. Flow Regulator A1185 is a normally closed valve requiring 10 psid to crack and 15 psid to fully open. Flow Regulator A1190 is a normally open valve that starts to close at 3 psid and is fully closed at 9 psid. The flow regulators are connected to pressure sensing lines, one from the pneumatic controller, and one from the ullage section of LN_2 Storage Tank A1150. The difference between the actual tank pressure and the reduced pressure from the pneumatic controller causes the regulators to open and close.

When tank pressurization begins, Flow Regulator A1190 is fully open and LN_2 flows at a maximum rate to Vaporizer A1189. The GN_2 output of the vaporizer is conducted to the storage tank to start pressurization. At a tank pressure of 25 psig, differential pressure across Flow Regulator A1190 starts regulator closing; the differential pressure across Flow Regulator A1185, however, is too low for operation. As Flow Regulator A1190 closes, the LN_2 flow to the vaporizer is throttled, thus reducing the rate of pressurization. As the tank pressure increases at the slower rate, differential pressure across Flow Regulators A1185 and A1190 increases thus further reducing the flow rate. This action continues until tank pressure reaches 63 psig. At that time, the differential pressure across Flow Regulator A1190 is sufficient for completely closing it; however, the differential pressure is still too low to actuate Flow Regulator A1185.

With Flow Regulator A1190 fully closed, tank pressurization stops; however, LN_2 boiloff may cause the tank pressure to increase. When tank pressure reaches 66 psig, the differential pressure across Flow Regulator A1185 is sufficient for cracking and thus venting the tank. For tank pressure exceeding 66 psig, an increased differential pressure will open Flow Regulator A1185 further. The flow regulator fully opens at a tank pressure of approximately 100 psig. Venting continues until the tank pressure returns to 66 psig. When tank pressure falls below 63 psig, Flow Regulator A1190 will restart the pressurization sequence.

1.2.2 GN_2 Pressure Regulators - GN_2 Pressure Regulators A1253 and A1267 regulate the pressure of the GN_2 flowing through the distribution lines. Pneumatic Pressure Regulator A1253 (figure 3-1) improves filtering efficiency by preventing the flow of GN_2 from the purification unit until back pressure is 3500 psig. The

regulator is initially closed, causing the back pressure to build up rapidly to 3500 psig. The regulator then cracks, allowing GN_2 to flow to the GN_2 storage battery at a nominal line pressure of 3500 psig. As the storage battery fills, the back pressure will increase towards the pumping pressure of the vaporizer.

Pressure Regulator A1267 (figure 3-3) reduces GN_2 pressure supplied from the storage battery to the LOX, RP-1, and LH_2 pneumatic control panels. The regulator is adjusted to maintain a pressure of 3500 psig and automatically regulates flow preventing any increase in pressure.

1.3 GN_2 STORAGE FACILITY OPERATION

There are three major functions associated with operation of the GN_2 storage facility: LN_2 storage tank pressurization, GN_2 transfer to the environmental control system, and GN_2 transfer to the fuel pneumatic control panels and the pneumatic control distributor.

1.3.1 LN_2 Storage Tank Pressurization - LN_2 Storage Tank A1150 (figure 3-1) is pressurized to provide a positive pressure head for LN_2 pumping operations. LN_2 is drawn from the storage tank, converted to GN_2, and returned to the ullage section of the tank.

1.3.1.1 Preparation. Preparations for the pressurization sequence are as follows:

a. Manual Valves A1157 and A1187 are opened.

b. Manual Valve A1186 is closed to transfer venting control to Vent Valve A1185.

c. Manual Valve A1191 is closed to transfer pressurizing control to Flow Control Regulator A1190.

d. Pneumatic Controller A1188, and Flow Regulators A1185 and A1190 are adjusted to satisfy operating requirements.

1.3.1.2 Pressurization. Manual Valve A1161 is opened to allow LN_2 from the storage tank to flow to the pressurization system. LN_2 flows through normally open Flow Regulator A1190 to Vaporizer A1189 converted to GN_2 and discharged in the tank ullage section. Relief Valve A1192 operates at 150 psig.

As ullage pressure increases to approximately 25 psig, output pressure from Pneumatic Controller A1188 begins to close Flow Regulator A1190 to reduce the rate of tank pressurization. At an ullage pressure of 63 psig, the controller output pressure causes the regulator to close and stops tank pressurization. Heat from the tank walls and from the pressurizing gas induces boiloff from the LN_2, which may cause pressure to exceed 63 psig. At 66 psig the pneumatic controller output causes Flow Regulator A1185 to open. Excess GN_2 flows from the storage tank through the pressurization line, Manual Valve A1187, Flow Regulator A1185, and Check Valve A1184

to the atmosphere. Reduction in ullage pressure to 63 psig by venting or by transferring LN_2 from the tank initiates the pressurizing operation. The system cycles throughout the launch sequence to maintain the storage tank pressure between 63 and 66 psig.

If Pneumatic Controller A1188 or Flow Regulators A1190 and A1185 should fail, pressurization and venting may be maintained by operation of Manual Valves A1191 and A1186. Storage tank ullage pressure is indicated by Pressure Gage A1158.

1.3.2 GN_2 Transfer to Environmental Control System (Figure 3-1) - LN_2 from Storage tank A1150 is converted to GN_2 in Vaporizers A1072 and A1229. The GN_2 is then transferred to the environmental control system (ECS).

1.3.2.1 Preparation. Preparations required prior to transferring GN_2 to the ECS are as follows:

a. Transfer line shutoff Manual Valve A1179 and venting Manual Valve A1182 are closed.

b. Manual Valves A1073 and A1221 are closed.

c. Vaporizer discharge manifold venting Manual Valve A1232 is closed.

1.3.2.2 Transfer. Vaporizer A1072 operates and Vaporizer A1229 remains on standby. Manual Valve A1221 is opened and LN_2 flows to Vaporizer A1072; Manual Valve A1073 remains closed as long as Vaporizer A1229 is on standby.

Manual Valve A1165 is opened and LN_2 flows from Storage Tank A1150, through Strainer A1175, past Relief Valve A1177, to Manual Valve A1179. Manual Valve A1179 is opened and LN_2 flow past Relief Valve A1181 through Manual Valve A1221, past Pressure Gage A1180 and into Vaporizer A1072. From the vaporizer, the GN_2 flows to the environmental control system.

Flow rate from Vaporizer A1072 is monitored by Flowmeter A1235 and controlled by adjusting Manual Valve A1179. Measurements from Pressure Transducer A1233 and Temperature Transducer A1234 are used to convert the flowmeter readings to standard cubic feet per minute (scfm). The vaporizer is capable of converting a maximum of 200 gpm of LN_2 at 65 psig to GN_2 at 50 psig and ambient temperature • 30 F. However, due to line pressure drops, the ECS receives the GN_2 at approximately 10 to 30 psig.

Standby Vaporizer A1229 is used whenever Vaporizer A1072 must be defrosted due to icing. Manual Valve A1221 is closed to shut off the flow of LN_2 to Vaporizer A1072. The standby vaporizer is then started and Manual Valve A1073 is opened supplying LN_2 to the standby vaporizer. The GN_2 output flows into the vaporizer discharge manifold, past Relief Valve A1231, and through Flowmeter A1235 to the environmental control system.

Vaporizers A1072 and A1229 are shut down when the environmental control system no longer requires GN_2. Manual Valves A1165, A1221, and A1073 are closed. Manual Valve A1182 is opened to vent the transfer line between storage tank A1150 and the vaporizer inlets. LN_2 flows through Check Valve A1198 before exhausting to the disposal area. The vaporizer discharge manifold is vented by opening Manual Valve A1232. GN_2 passes through Check Valve A1389 before exhausting to the atmosphere.

1.3.3 GN_2 Transfer to Pneumatic Control Distributor and Propellant Pneumatic Control Panels (Figures 3-1 and 3-3) - LN_2 is transferred from storage tank A1150 to three operating LN_2/GN_2 converter-compressor units; a fourth converter-compressor unit remains on standby in case one of the operating units fail. LN_2 is first converted to GN_2 by passing it through three vaporizers. From the vaporizers, GN_2 flows to the GN_2 storage battery which supplies GN_2 at 6000 psig to the pneumatic control distributor and the pneumatic control panels of the propellant systems.

1.3.3.1 Preparation. Preparations required for transferring GN_2 to the pneumatic control distributor and the propellant pneumatic control panels are as follows:

a. GN_2 storage facility pressure gage Manual Valves A912, A910, A1344, A857, A905, A862, A866, A900, A895, A885, A889, A844, A877, A872, A841, A850, A854, A842, A843, A917, A914 and A920 are opened.

b. LN_2 reservoir venting Manual Valves A1144, A1115, and A1100 (figure 3-1) are opened.

c. Manual Valve A1201 is closed on standby LN_2 Reservoir A1075.

d. Transfer line venting Manual Valve A1183 (figure 3-1), vaporizer supply header vent Manual Valves A1102 and A1220, LN_2 reservoir vent Manual Valves A1143, A1116, A1099, and A1202, LN_2 pump Manual Valves A1146, A1110, A1095, and A1206, LN_2 pump discharge vent Manual Valves A1133, A1122, A1085, and A1212, vaporizer discharge manifold vent Manual Valve A1237, desiccant holder Manual Valves A932 and A933, GN_2 purification unit discharge line Manual Valves A1245, A926, and A1256, Manual Valve, A927, GN_2 storage battery (figure 3-3) Manual Valves A1305, A908, A1258, A1275, A893, A890, A909, A870, A867, and A855, and pneumatic control distributor line Manual Valve A1266 are closed.

e. Pumping facility Manual Valves A1103 and A1218 (figure 3-1) and LN_2 pump Manual Valves A1114, A1219, and A1101 are opened.

f. Manual Valve A1074 is closed to place LN_2 Pump A1208 on standby.

g. Vaporizer discharge line Manual Valves A1130, A1125, and A1082 are opened.

h. Manual Valve A1225 is closed and Vaporizer A785 remains on standby.

i. Manual Valve A928 or Manual Valve A929 must be opened to admit GN_2 to one side of the hydrocarbon removal units, the other side remains on standby. In a like manner, either Solenoid Valve A938 or Solenoid Valve A939 must be opened to admit GN_2 to one side of the water-vapor removal units.

j. Pneumatic Pressure Regulator A1253 in the storage battery supply line is adjusted for 3500 psig back pressure, and Manual Valve A1246 is closed.

k. Storage battery supply line Manual Valve A1298, and GN_2 storage tank Manual Valves A846, A879, A881, A903, and A1272 are opened.

l. Manual Valves A913, A916, A1278 and A1268 in the GN_2 distribution lines are closed.

m. Pressure Regulator A1267 in the fuel system pneumatic control panels supply line is adjusted for a downstream pressure of 3500 psig.

1.3.3.2 Transfer. Manual Valve A1164 (figure 3-1) is opened and 65 psig LN_2 flows through Strainer A1176, past 150 psig Relief Valve A1178 through the transfer line, and into the LN_2 pumping unit supply header. The pump-unit supply header is protected by Relief Valves A1217 and A1104 which vent pressure in excess of 150 psig. LN_2 in the supply header passes through pumping unit Manual Valves A1103 and A1218, LN_2 pump Manual Valves A1114, A1219, and A1101, and into the LN_2 Reservoirs A1142, A1117, and A772. LN_2 pump Manual Valve A1074, and LN_2 Reservoir A1075 remain inoperative on standby pump A1208. LN_2 at -320 F vaporizes upon entering the relatively warm LN_2 Reservoirs A1142, A1117, and A772 and is vented to atmosphere through Manual Valves A1144, A1115, and A1100, and Check Valve A1198 in the vent line. The reservoirs continue to cool down to LN_2 temperature.

Pump discharge Manual Valves A1133, A1122, and A1085 and LN_2 pump blowby Manual Valves A1146, A1110, and A1095 are opened. LN_2 Vaporizers A1132, A1123, and A1084 are started, and LN_2 pumps A1138, A1108, and A1093 are started by Motors A1137, A1107, and A1092 respectively when cooldown has been accomplished. Manual Valve A1212, blowby manual Valve A1206, LN_2 Vaporizer A785, LN_2 Pump A1208, and Motor A1079 remain inoperative on the standby unit.

Air trapped in the pump discharge lines is bled through pump discharge Manual Valves A1133, A1122, and A1085. The valves are closed when a steady stream of LN_2 flows from them.

Low pressure Manual Valves A1144, A1115, and A1100 are gradually closed to prevent LN_2 Pumps A1138, A1108, and A1093, respectively, from cavitating. Should any one of the pumps begin to cavitate, the low pressure Manual Valves A1143, A1116, or A1099 in the respective reservoir is opened, thus venting GN_2 to the atmosphere. Any open manual valve will be closed when its respective pump no longer experiences cavitation.

Pump blowby Manual Valves A1146, A1110, and A1095 are slowly closed until LN_2 pump blowby pressure as indicated by Gages A1147, A1111, and A1096, is approximately equal to LN_2 reservoir pressure. Reservoir pressure is indicated by Gages A1149, A1113, and A1098. Pump inlet and blowby Pressure Gages A1203 and A1204 remain inactive on the standby unit.

Overpressure protection for the three operative LN_2 reservoirs and LN_2 pump blowby lines is provided by Relief Valves A1148, A1112, and A1097 and Relief Valves A1145, A1109, and A1094 which vent excess LN_2 at 200 and 150 psig, respectively. Relief Valves A1205 and A1207 remain inoperative on the standby unit.

Vaporizer discharge pressure is indicated by Pressure Gages A1135, A1105, and A1090. Pressure switches A1136, A1106, and A1091 actuate and shut down the respective LN_2 pump if pump discharge pressure exceeds 6700 psig. Over pressure protection in the discharge line is provided by Relief Valves A1131, A1124, and A1083 which vent excess GN_2 at 6800 psig to the atmosphere. Temperature Switches A1128, A1127, A1080, and A1227 protect the LN_2 pumps from overheating by shutting the pumps down at 0 F or above. Pressure Switch A1213 Temperature Switch A1227, Pressure Gage A1214, and Relief Valve A1224 are inoperative on the standby unit.

Discharge line pressure is indicated by Pressure Gage A1239. Relief Valve A1235 vents excess GN_2 at 6400 psig to the atmosphere. GN_2 from the vaporizer discharge line passes through Check Valve A1250, through Manual Valve A928, Desiccant Holder A934, and Check Valve A937, or through Manual Valve A929, Desiccant Holder A931, and Check Valve A936. Desiccant Holders A931 and A934 are alternately isolated to replace contaminated desiccant cartridges. Manual Valves A933 and A932 are opened to drain collected hydrocarbon.

GN_2 enters the water vapor removal unit through Solenoid Valve A938, Desiccant Holder A942, and Check Valve A944, or through Solenoid Valve A939, Desiccant Holder A941, and Check Valve A945. The desiccant holders are alternately placed on standby and dried by an automatic device which controls Solenoid Valves A938 and A939.

Pressure in the hydrocarbon and water vapor removal desiccant holders is indicated by Pressure Gages A930, A935, A940, and A943. GN_2 flows from the water vapor removal unit, past Sampling Point A1242, Pressure Gage A1251, and through a 20-micron Filter A1252. Fifty psid Differential Pressure Switch A1243 monitors the pressure differential across the filter.

Pressure Regulator A1253 opens when supply pressure reaches 3500 psig. The regulator is fully open when downstream pressure matches the maximum pump discharge pressure of 6000 psig. Manual valve A1246 is opened and GN_2 at 6000 psig flows past 6400 psig Relief Valve A1247, past Pressure Gage A1254, and through Flowmeter A1249. Pressure Transducer A1248 and Temperature Transducer 1255 are used to convert the flowmeter readings to scfm.

GN_2 flow continues through Check Valve A1300 and past Pressure Gage A1302 to a manifold which serves both as a duct for filling or replenishing the GN_2 storage battery and as a discharge manifold. The manifold supplies GN_2 to the propellant pneumatic control panels and the pneumatic control distributor. Manifold pressure is indicated by Pressure Transducer A1274 and by Pressure Gages A906 and A1280. Manifold temperature is indicated by Temperature Transducer A1273. Overpressure protection is provided by 6400 psig Relief Valves A845, A880, and A1277.

During filling or replenishing operations, GN_2 supplied to the manifold enters six pairs of GN_2 Storage Tanks, A851 and A852, A873 and A874, A886 and A887, A896 and A897, A863 and A864, and A858 and A1260 through Manual Valves A846, A879, A881, A902, A903, and A1272. Storage tank inlet and drain manifold pressure is indicated by Pressure Gages A1269 and A1259, A861 and A865, A901 and A894, A884 and A888, A878 and A871, and A849 and A853. Relief Valves A1270, A859, A898, A883, A876, and A848 vent excess GN_2 at 6400 ($\pm$ 100) psig.

When pressure in the GN_2 storage tanks reaches 6000 psig, Manual Valves A913, A916, and A1278 are opened. GN_2 flows from the storage tanks through three lines to the pneumatic control distributor. Pressure in the GN_2 manifold lines is indicated by Pressure Gages A915, A918 and A1279.

A single line from the GN_2 manifold supplies the propellant systems pneumatic control panels. Manual Valve A1268 is opened and GN_2 flows past Pressure Gage A1261 to Pressure Regulator A1267 where line pressure is reduced from 6000 to 3500 psig. Manual Valve A1264 is kept closed until line pressure builds up to 3500 psig as indicated by Pressure Gage A821. Relief Valve A1263 relieves line pressure in excess of 3750 psig into the GN_2 vent line. When line pressure reaches 3500 psig the manual valves is opened and GN_2 flows past Pressure Gage A1262 to the propellant pneumatic control panels.

When the pneumatic control distributor and the propellant pneumatic control panel requirements have been met, supply line Manual Valves A1264, A1268, A1278, A913, and A916 are closed.

LN_2 Pumps A1138, A1108, and A1093 (figure 3-1) and LN_2 Vaporizers A1132, A1123, and A1084 are manually shut down when GN_2 storage battery pressure exceeds 6000 psig.

When the pumping units are completely shut down, the LN_2 transfer line Manual Valve A1164 and the LN_2 storage tank pressurization system Manual Valve A1161 are closed. LN_2 storage tank ullage pressure may be vented by opening Manual Valve A1186.

After the pumping units are shut down all LN_2 transfer lines and associated equipment are drained. The LN_2 transfer line is drained by opening Manual Valve A1183. All operating or standby Manual Valves A1144, A1146, A1115, A1110, A1100, A1095, A1201, and A1206 that have been exposed to LN_2 are opened. All drained LN_2 flows into a common vent line and is exhausted to the atmosphere through Check Valve A1198.

The GN_2 transfer lines, storage tanks, and associated equipment are vented as required to provide an ambient pressure environment necessary for making repairs. The vaporizer discharge line may be vented to the atmosphere through Check Valve A1386 by opening Manual Valve A1237. The GN_2 purification unit discharge line may be vented through Manual Valves A1245, A926, and A1256 and Check Valves A1244, A925, and A1390 to the vent line and the atmosphere. The entire GN_2 storage facility, or any portion, may be vented by opening applicable Manual Valves A1305, A908, A909, A1275, A1258, A855, A867, A870, A893 and A890 (figure 3-3) so that GN_2 may pass through Check Valves A1306, A907, A904, A1276, A1257, A856, A868, A869, A892 and A891 to the vent line. The propellant pneumatic control panels supply line may be vented through Manual Valve A1266 and Check Valve A1265 to the vent line.

1.4 HELIUM STORAGE FACILITY COMPONENT DESCRIPTION

The functional relation of helium facility components is illustrated schematically in section 3 and described in section 2. Several components are further described below.

Pressure Regulators A1365, A1003, and A987 (figure 3-2) reduce the helium supply pressure from 2200 psig to 120 psig to meet the inlet pressure requirements of Compressors A1051, A1024, and A979. The regulators are manually adjusted and remain open during transfer operations until the downstream pressure rises to 120 psig. The regulators then maintain a 120 psig flow.

Pneumatically operated Pressure Regulators A1320, A1039, and A964 increase filtering efficiency of the purification section of each helium compressor unit by preventing flow until the pressure reaches 3500 psig. The pressure regulator remains closed until pressure upstream in the purification section increases to 3500 psig. The regulator then opens gradually with increasing pressure and is fully open when pressure has built up to 6000 psig on both sides of the regulator. The regulator is provided with 120 psig reference pressure from the inlet side of the compressor unit.

Pressure Regulator A1333 increases filtering efficiency of the helium purification system by preventing flow until the pressure is 3500 psig. The regulator remains closed until pressure in the purification system increases to 3500 psig. The regulator then opens gradually with increasing pressure and is fully open when pressure has built up to 6000 psig on both sides of the regulator. The regulator is dome loaded with pneumatic line pressure and is calibrated by manually adjusting a hand valve in the dome loading line.

1.5 HELIUM STORAGE FACILITY OPERATIONS

The helium storage facility receives a supply of gaseous helium from a tube bank trailer . The helium is transferred from the trailer to compressor units. High-pressure helium gas is then routed through a purification system and into the storage battery. The storage battery delivers purified helium to the pneumatic control distributor.

1.5.1 Helium Transfer to the Helium Storage Facility - Gaseous helium is transferred from the tube bank trailer to compressor units and is compressed to 6000 psig. From the compressors the helium flows through the purification system where impurities are removed, and then to the storage battery.

1.5.1.1 Preparation. Prior to transferring helium to the storage tanks, the following preparations are required.

a. Helium storage tank pressure gage Manual Valves A796, A794, A832, A830, A815, A812, A806, A802, A836, and A839 (figure 3-3) are opened.

b. Helium storage tank venting Manual Valves A1307, A825, A1313, A810, A1287, A807 and A834 are closed.

c. Helium supply manifold vent Manual Valve A1359 (figure 3-2), helium compressor unit Manual Valves A989, A1001, A1354, A959, A1043, and A1317, helium purification unit Manual Valves A1329, A1348, and A1070, and purification unit discharge line Manual Valves A1342, A1340, A1385, and A793 are closed.

d. Helium facility Manual Valves A983, A946, A967, A1020, A1019, A1036, A1367, A1047, and A1380 (figure 3-2) are closed.

e. Compressor facility Manual Valves A993, A1362, and A997 are closed prior to attaching fill lines from the tube bank trailer to Couplings A991, A1363, and A995.

f. Helium compressor unit Manual Valves A1002 and A1353 and Manual Valves A1032, A1037, A1042, A1375, A1381, and A1316 are opened.

g. Manual Valves A988, A971, A966, and A960 are closed placing Compressor A979 on standby.

h. Either Manual Valves A1350 and A1346 are opened to place Desiccant Holders A1349, A1059, A1060, and A1061 in service, or Manual Valves A1063 and A1065 are opened to place Desiccant Holders A1066, A1067, A1068, and A1069 in service.

i. Pressure Regulator A1333 is adjusted for a cracking pressure of 3500 psig and Manual Valve A1334 is closed to prevent flow to the helium storage battery in the event of a regulator malfunction.

j. Helium storage battery Manual Valve A1295 (figure 3-3) and helium storage tank Manual Valves A826, A819, A798 and A1283 are opened.

k. Discharge line Manual Valves A1382, and A922 are closed.

1.5.1.2 Transfer. Helium Compressors A1024 and A1051 (figure 3-2) are started by Motors A1023 and A1050 and Solenoid Valves A1022 and A1369 are automatically opened Compressors A979, Motor A980, and Solenoid Valve A981 on the standby unit remain inoperative.

Manual Valves A993, A1362, and A997 are opened and helium flows from the tube bank trailer through Couplings A991, A1363, and A995, and Check Valves A994, A1361, and A998. Supply line pressure is indicated by Pressure Gages A992, A1364, A996, A1356, and A999.

The helium then passes through Filter A1358, to the supply manifold. Differential pressure across the filter is monitored by Differential Pressure Switch A1393. Relief Valve A1357 relieves manifold pressure in excess of 2800 psig. Normal manifold pressure is 2200 psig.

Helium in the supply manifold flows through compressor Manual Valves A1002 and A1353 and Pressure Regulators A1003 and A1365 to the pressure induction lines. Helium pressure is indicated by Pressure Gages A1004 and A1366. Standby unit Pressure Regulator A987 and Pressure Gage A986 remain inoperative while standby unit is not in use.

Helium enters inlet Traps A1368 and A1021 and flows through Solenoid Valves A1369 and A1022 into Compressors A1051 and A1024.

As compressor pressure builds up, Unloaders A1015 and A1324 are actuated momentarily by Solenoid Valves A1014 and A1323 to vent oil and moisture present in Traps A1012, A1026, A1009, A1053, A1371, A1056 and A1376 and A1029, and to purge air from Compressors A1051 and A1024. Unloader A951 and Solenoid Valve A950 on the standby unit remain inactive.

First, second, and third stage Intercoolers A1052, A1370, and A1055, and A1013, A1025, and A1010, and Aftercoolers A1373 and A1028 on Compressors A1051 and A1024, respectively, remove the compression heat from the helium gas and maintain temperature within ±20 F of ambient. Intercooler Traps A1053, A1371, A1056, A1012, A1026, A1009, and Aftercooler Traps A1376 and A1029 remove oil and water present in the gaseous helium. Overpressure protection for the first, second, and third stage traps is provided by Relief Valves A1403, A1405, and A1407 and A1404, A1406, and A1408 which vent helium in excess of 435 psig, 1400 psig, and 4300 psig, respectively, to the atmosphere. Intercoolers A952, A978, and A955, Aftercooler A975, Intercooler Traps A953, A977, and A956, Aftercooler Trap A974, and Relief Valves A1411, A1412, and A1413 remain inoperative on the standby unit.

Pressure Gages A1054, A1372, A1057, and A1374, and A1011, A1027, A1008, and A1031 provide indications of first, second, third, and fourth discharge pressure on Compressors A1051 and A1024. Standby unit Pressure Gages A954, A976, A957, and A972 remain inactive.

Crankcase blowby helium from Compressors A1051 and A1024 passes through Check Valves A1325 and A1016, Precoolers A1049 and A1017, Precooler Traps A1048 and

A1018, and returns to Receivers A1368 and A1021 for re-induction to the compressors. Oil and moisture present in the precooler traps is periodically vented to the atmosphere by opening Manual Valves A1047 and A1019. Standby unit Check Valve A949, Precooler A948, and Precooler Trap A947 are inoperative. Vent Valve A946 is normally closed.

Helium discharging from the compressors at 6000 psig passes through the aftercooler traps and Check Valves A1399 and A1398 to the compressor unit purification section. Pressure Switches A1377 and A1030 will automatically shut down Compressors A1051 and A1024 if the discharge pressure exceeds 6400 psig. Standby unit Check Valve A1397 and Pressure Switch A973 remain inoperative.

Helium enters the compressor purification section through Manual Valves A1375 and A1032 and passes through Mechanical Separators A1378 and A1033, Desiccant Holders A1058, A1402, A1034, and A1401 and Filters A1379 and A1035. The separator, desiccant holders, and filter remove oil, water, water vapor, and foreign matter from the helium. Helium leaves the purification section through Manual Valves A1381 and A1037. Each helium compressor unit is capable of being shut down independently of the other as required to service the purification equipment. The servicing operation includes venting the purification section through Manual Valve A1380 and A1036, and also venting the drain valve on Mechanical Separator A1378 or A1033 before replacing the cartridges in the desiccant holders or drying the filter. Standby Compressor A979 must be started if either of the operational compressors is shut down.

Compressed helium passes through Pressure Regulators A1320 and A1039 which prevent flow at pressures below 3500 psig. As the storage battery is charged, discharge pressure builds up to 6000 psig. Storage battery pressure is indicated by Pressure Gages A1319 and A1040. Pressure Gages A1322 and A1007 indicate the regulator control pressure. Pressure Regulator A964 and Pressure Gages A962 and A963 are not operational on the standby unit.

Helium leaves the compressor units through Manual Valves A1316 and A1042 and Check Valves A1315 and A1041 and enters the inlet line to the helium purification system. Manual Valve A960 and Check Valve A961 on the standby unit are not operational.

Relief Valves A1326 and A1327, preset to relieve at 6450 psig, provide overpressure protection for the discharge line. Pressure Gages A1330, A1388, and A1064 indicate helium purification system inlet pressure.

Helium from the compressor units passes through Check Valve A1351 and into the purification system through Manual Valve A1350 and Desiccant Holders A1349, A1059, A1060, and A1061 or through Manual Valve A1063 and Desiccant Holders A1066, A1067, A1068, and A1069. The desiccant banks are alternately isolated and recharged as required with clean desiccant cartridges. A low pressure environment for replacement of cartridges is provided by venting helium to the vent line through Manual Valve A1070 and Check Valve A1071, or through Manual Valve A1348 and Check Valve A1347.

Helium leaves the purification system through Manual Valve A1346 or Manual Valve A1065 and enters the discharge line.

Helium flows through 20-micron Filter A1332 to Pressure Regulator A1333. Differential pressure across the filter is monitored by Differential Pressure Switch A1394. Pressure Regulator A1333 prevents flow until 3500 psig back pressure is reached, as indicated by Pressure Gage A1331. Manual Valve A1334 is then opened to allow helium to flow to the storage battery. As downstream pressure increases above 3500 psig, the regulator opens and line pressure rises to the normal delivery pressure of 6000 psig.

Pressure Gage A1335 indicates line pressure downstream from Manual Valve A1334, and Relief Valve A1339 vents excess helium to the vent line at 6400 psig. Flowmeter A1337 indicates line flow rate. Measurements taken from Temperature Transducer A1336 and Pressure Transducer A1338 are used to convert the flowmeter readings to scfm. The normal flow rate is 150 scfm per compressor.

Helium flows through the transfer line and into the He storage battery (figure 3-3), past Pressure Gage A1296, past 6400 psig Relief Valve A1310, and through Manual Valve A1295. The flow continues through Filter A1309, through Check Valve A1293, and past Pressure Gage A1291 into the helium storage tank supply manifold. Differential pressure across Filter A1309 is monitored by Differential Pressure Switch A1294.

The helium inlet line discharges into a duct that serves as a manifold for filling and replenishing Storage Tanks A831 and A1311, A814 and A813, A803 and A804, and A837 and A838. The duct also serves as a discharge manifold for the storage tanks. Manifold pressure is indicated by Pressure Gages A823 and A1288, and by Pressure Transducer A1290. Manifold temperature is indicated by Temperature Transducer A1289. Relief Valves A820 and A1285 vent pressure in excess of 6400 psig into the vent line.

During filling or replenishing operations, helium supplied to the manifold enters four pairs of storage tanks through Manual Valves A826, A819, A798 and A1283. Inlet manifold and tank pressure is monitored by Pressure Gages A829 and A1312, A816 and A811, and A801 and A805, and A1281 and A835. Relief Valves A828, A817, A1285, A820, A800, and A1284 vent at 6400 (± 100) psig.

Helium Compressors A1051 and A1024 (figure 3-2) are shut down when helium supply requirements have been met.

The helium compressors and the storage facility are not vented during or after the operating sequence. Venting is a procedure used only to provide the low pressure environment required for system repairs. The helium supply line and manifold may be vented through Manual Valves A1359, A989, A1001, and A1354 and Check Valves A1360, A990, A1000, and A1355 to the vent line. Compressor

discharge lines that contain pressurized helium may be vented through Manual Valves A959, A1043, A1317, and A1329, and Check Valves A958, A1044, A1318, and A1328 respectively. The helium purification unit may be vented through Manual Valves A1070 and A1348, and Check Valves A1071 and A1347 when the desiccant holders are being recharged. The purification system discharge line may be vented through Manual Valves A1342, A1340, and A1385, and Check Valves A1343, A1341, and A1384 into the vent line. The storage battery inlet and discharge manifold (figure 3-3) may be vented through Manual Valves A1307, A825, and A1287, and Check Valves A1308, A824 and A1286 into the vent line. Each pair of storage tanks may be vented through Manual Valves A1313, A810, A807, and A834, and Check Valves A1314, A809, A808, and A833 into the vent line.

1.5.2 Helium Transfer to the Pneumatic Control Distributor (Figure 3-3) - Helium is transferred from the storage battery to the pneumatic control distributor through two transfer lines.

1.5.2.1 Preparation. Prior to transferring helium to the pneumatic control distributor, the following preparations are required:

a. Pressure gage Manual Valves A771 and A923 are opened.

b. Manual Valves A922 and A1382 already closed for the storage battery charging sequence, remain closed.

1.5.2.2 Transfer. When helium storage battery pressure reaches 6000 psig, Manual Valves A932 and A1382 are opened, permitting helium to flow into both transfer lines. Helium at 6000 psig flows through the transfer lines to the pneumatic control distributor. Line pressure is indicated by Pressure Gages A1383 and A924.

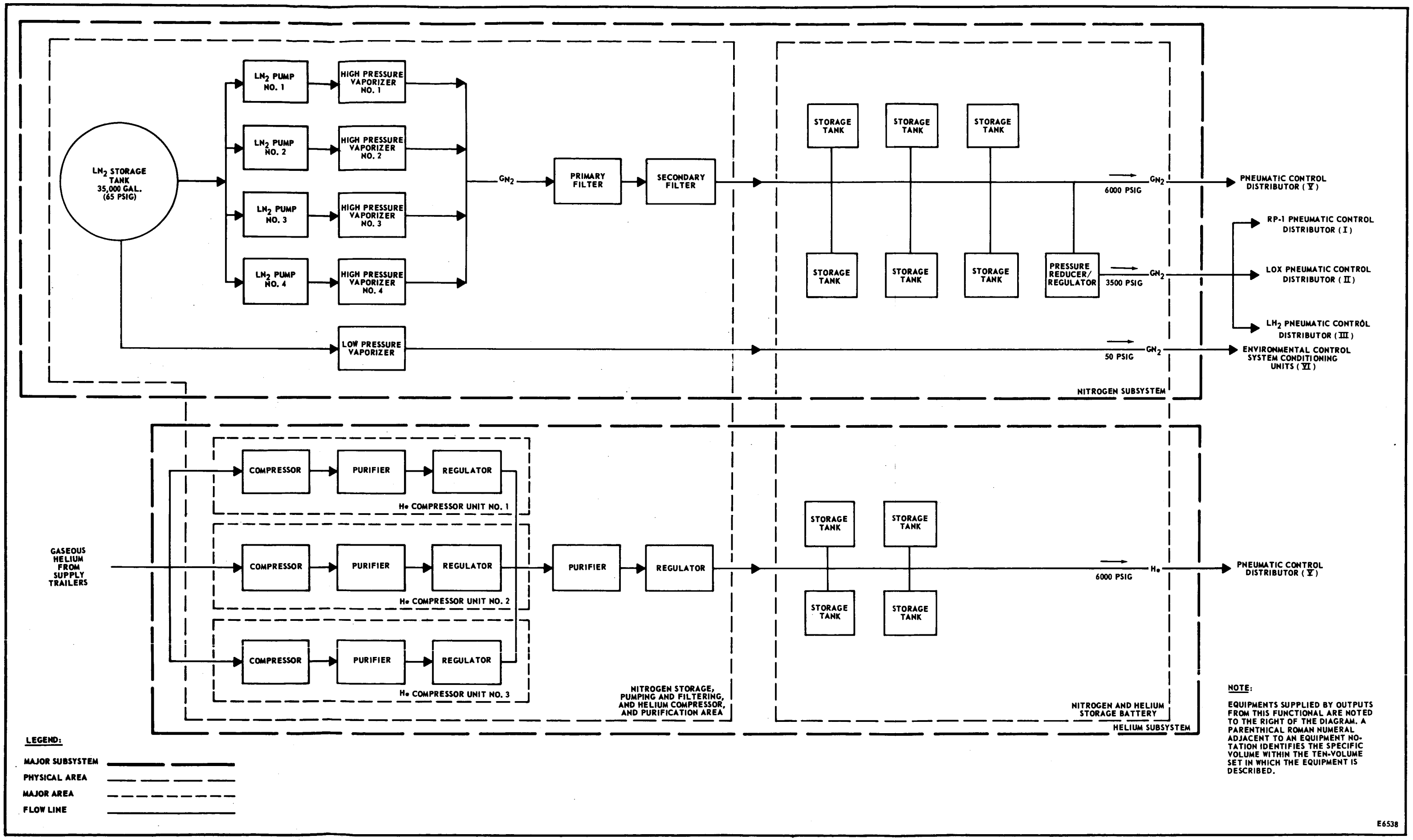

Figure 1-1. Nitrogen and Helium Storage Facility Block Diagram

SECTION 2

INDEX OF FINDING NUMBERS

This section contains an alpha-numerical list by finding number of nitrogen and helium storage facility components that function in the course of a normal countdown. Additional columns in the index of finding numbers provide such pertinent information as component description and function, part number, and the supplier's name and part number. A break will occur in the alpha-numeric sequence of finding numbers when a component, or component series is: non-functional during the countdown; functional only in the event of a malfunction; functional in terms of a maintenance operation only; or part of another functional system.

The letter prefix on finding numbers identify components with either the launch complex or an area of the launch vehicle. The area associated with each prefix is noted below.

FINDING NUMBER PREFIX	DESIGNATED AREA
A	Ground support components
B	S-I stage components
E	S-IV stage components
G	Instrument unit
H	Payload

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A771	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6D-401B-2M		
A772	1	Reservoir	LN_2	Cosmodyne Part of P/N 3100900	Part of 10428625	
A773 through A784 are not functionally applicable to this system.						
A785	1	Vaporizer	6000 psig, 1000 scfm	Cosmodyne P/N 241000	Part of 10428625	
A786 through A792 are not functionally applicable to this system.						
A793	1	Valve, Manual	vent			
A794	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6D-401B-2M	10428535	
A795 is not functionally applicable to this system.						
A796	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6D-401B-2M	10428535	
A797	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A798	1	Valve, Manual	1-1/2 in., shutoff	Vacco P/N M-6P-X467-2G	10428531	
A799 is not functionally applicable to this system.						

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A800	1	Valve, Relief	1 in.; relieves at 6400 (± 100) psig	Ladewig Co. P/N 158SFF	10428540	
A801	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A802	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-501B-2M	10428535	
A803	1	Tank, Storage	6000 psig helium storage; 200 cu ft capacity	A. O. Smith Corp. P/N MV-50717 & MV-50717A	10428621	
A804	1	Tank, Storage	6000 psig helium storage; 200 cu ft capacity	A. O. Smith Corp. P/N MV-50717 & MV-50717A	10428621	
A805	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A806	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A807	1	Valve, Manual	3/4 in., vent	Vacco P/N M-6P-X464-2G	10428533	
A808	1	Valve, Check	3/4 in.; spring-loaded poppet type	Vacco P/N CVL-6P-X464	10428538	
A809	1	Valve, Check	3/4 in.; spring-loaded poppet type	Vacco P/N CVL-6P-X464	10428538	
A810	1	Valve, Manual	3/4 in., drain	Vacco P/N M-6P-X464-2G	10428533	
A811	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A812	1	Valve, Manual	1/4 in., shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A813	1	Tank, Storage	6000 psig helium storage; 200 cu ft capacity	A. O. Smith Corp. P/N MV-50717 & MV-50717A	10428621	
A814	1	Tank, Storage	6000 psig helium storage; 200 cu ft capacity	A. O. Smith Corp. P/N MV-50717 & MV-50717A	10428621	
A815	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A816	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A817	1	Valve, Relief	1 in., relieves at 6400 (±100) psig	Ladewig Valve Co. P/N N-1072	10428540	
A818 is not functionally applicable to this system.						
A819	1	Valve, Manual	1-1/2 in., shutoff storage tank fill	Vacco P/N M-6P-X467-2G	10428531	
A820	1	Valve, Relief	1 in.; relieves at 6400 (± 100) psig	Ladewig Valve Co. P/N N-1072	10428540	
A821	1	Gage, Pressure	0 to 5000 psig range; 3500 psig normal indication	Helicoid P/N 3341	10428545	
A822	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-401B-2M	10428535	
A823	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A824	1	Valve, Check	1/2 in., cracking pressure 5 psig max.	Security Valve Co. P/N A1127-1	10428539	
A825	1	Valve, Manual	1 1/2 in., shutoff	Vacco P/N MA-6P-X463-2G	10428534	
A826	1	Valve, Manual	1 1/2 in., shutoff, He tank fill	Vacco P/N M-X467-2G	10428531	
A827 is not functionally applicable to this system.						
A828	1	Valve, Relief	Relieves at 6400 (± 100) psig	Ladewig Co. P/N 158SFF	10428540	
A829	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A830	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A831	1	Tank, Storage	6000 psig helium storage; 200 cu ft capacity	A. O. Smith Corp. P/N MV-50717 & MV-50717A	10428621	
A832	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A833	1	Valve, Check	3/4 in.	Vacco P/N CLV-6P-X464	10428538	
A834	1	Valve, Manual	3/4 in., drain	Vacco P/N M-6P-X464-2G	10428533	
A835	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A836	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A837	1	Tank, Storage	6000 psig helium storage; 200 cu ft capacity	A. O. Smith Corp. P/N MV-50717 & MV-50717A	10428621	
A838	1	Tank, Storage	6000 psig helium storage; 200 cu ft capacity	A. O. Smith Corp. P/N MV-50717 & MV-50717A	10428621	
A839	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A840 is not functionally applicable to this system.						
A841	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A842	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A843	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A844	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A845	1	Valve, Relief	Relieves at 6400 (± 100) psig	Ladewig Co. P/N 158XSFF	10428640	
A846	1	Valve, Manual	1 1/2 in., shutoff, GN_2 Storage tank fill	Vacco P/N M-6P-X467-2G	10428531	
A847 is not functionally applicable to this system.						

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A848	1	Valve, Relief	Relieves at 6400 (± 100) psig	Ladewig Co. P/N 158SFF	10428540	
A849	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A850	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A851	1	Tank, Storage	6000 psig GN_2 storage; 200 cu ft capacity	A. O. Smith Corp. P/N MV-50717 & MV-50717A	10428621	
A852	1	Tank, Storage	6000 psig GN_2 storage; 200 cu ft capacity	A. O. Smith Corp. P/N MV-50717 & MV-50717A	10428621	
A853	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A854	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A855	1	Valve, Manual	3/4 in., vent	Vacco P/N M-6P-X464-2G	10428533	
A856	1	Valve, Check	3/4 in.	Vacco P/N CLV-6P-X464	10428533	
A857	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A858	1	Tank, Storage	6000 psig GN_2 storage; 200 cu ft capacity	A. O. Smith Corp. P/N MV-50717 & MV-50717A	10428621	
A859	1	Valve, Relief	Relieves at 6400 (± 100) psig	Ladewig Co. P/N 158SFF	10428540	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A860 is not functionally applicable to the system.						
A861	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A862	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A863	1	Tank, Storage	6000 psig GN_2 storage; 200 cu ft capacity	A. O. Smith Corp. P/N MV-50717 & MV-50717A	10428621	
A864	1	Tank, Storage	6000 psig GN_2 storage; 200 cu ft capacity	A. O. Smith Corp. P/N MV-50717 & MV-50717A	10428621	
A865	1	Gage, Pressure	0 to 10,000 psig range; 6,000 psig normal indication	Helicoid P/N 3341	10428544	
A866	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-401B-2M	10428535	
A867	1	Valve, Manual	3/4 in., vent	Vacco P/N M-6P-X464-2G	10428533	
A868	1	Valve, Check	3/4 in.	Vacco P/N M-6P-X464-2G	10428538	
A869	1	Valve, Check	3/4 in.	Vacco P/N CLV-6P-X464	10428538	
A870	1	Valve, Manual	3/4 in., vent	Vacco P/N M-6P-X464-2G	10428533	
A871	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A872	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N MV-6P-401B-2M	10428621	
A873	1	Tank, Storage	6000 psig GN_2 storage; 200 cu ft capacity	A. O. Smith Corp. P/N MV-50717 & MV-50717A	10428621	
A874	1	Tank, Storage	6000 psig GN_2 storage; 200 cu ft capacity	A. O. Smith Corp. P/N MV-50717 & MU50717A	10428621	
A875 is not functionally applicable to this system.						
A876	1	Valve, Relief	Relieves at 6400 (± 100) psig	Ladewig Co. P/N 158SFF	10428540	
A877	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A878	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A879	1	Valve, Manual	1-1/2 in., shutoff, GN_2 tank fill	Vacco P/N M-6P-X407-2G	10428531	
A880	1	Valve, Relief	Relieves at 6400 (± 100) psig	Ladewig Co. P/N 158SFF	10428540	
A881	1	Valve, Manual	1-1/2 in., shutoff, GN_2 tank fill	Vacco P/N M-6P-X467-2G	10428531	
A882 is not functionally applicable to this system.						
A883	1	Valve, Relief	Relieves at 6400 (± 100) psig	Ladewig Co. P/N 158SFF	10428540	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A884	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A885	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-401B-2M	10428621	
A886	1	Tank, Storage	6000 psig GN_2 storage; 200 cu ft capacity	A. O. Smith Corp. P/N MV-50717 & MV-50717A	10428621	
A887	1	Tank, Storage	6000 psig GN_2 storage; 200 cu ft capacity	A. O. Smith Corp. P/N MV-50717 & MV-50717A	10428621	
A888	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A889	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A890	1	Valve, Manual	3/4 in., vent	Vacco P/N M-6P-X464-2G	10428533	
A891	1	Valve, Check	3/4 in.	Vacco P/N CLV-6P-X464	10428538	
A892	1	Valve, Check	3/4 in.	Vacco P/N CLV-6P-X464	10428538	
A893	1	Valve, Manual	3/4 in., vent	Vacco P/N M-6P-X464-2G	10428533	
A894	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indicated	Helicoid P/N 3341	10428544	
A895	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A896	1	Tank, Storage	6000 psig GN_2 storage; 200 cu ft capacity	A. O. Smith Corp. P/N MV-50717 & MV-50717A	10428621	
A897	1	Tank, Storage	6000 psig GN_2 storage; 200 cu. ft. capacity	A. O. Smith Corp. P/N MV-50717 & MV-50717A	10428621	
A898	1	Valve, Relief	Relieves at 6400 (± 100) psig	Ladewig Co. P/N 158SFF	10428540	
A899 is not functionally applicable to this system.						
A900	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A901	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	104238544	
A902	1	Valve, Manual	1-1/2 in., shutoff, GN_2 tank fill	Vacco P/N M-6P-X467-2G	10428531	
A903	1	Valve, Manual	1-1/2 in., shutoff GN_2 tank fill	Vacco P/N M-6P-X467-2G	10428531	
A904	1	Valve, Check	1/2 in., cracking pressure 5 psig maximum	Security Valve Co. P/N A1127-1	10423539	
A905	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A906	1	Gage, Pressure	0 to 10,000 psig range 6000 psig normal indication	Helicoid P/N 3341	10428544	
A907	1	Valve, Check	1/2 in., cracking pressure 5 psig maximum	Security Valve Co. P/N A1127-1	10428439	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A908	1	Valve, Manual	1/2 in., vent	Vacco P/N MA-6P-X463-2G	10428534	
A909	1	Valve, Manual	1/2 in., vent	Vacco P/N MA-6P-X463-2G	10428534	
A910	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10438535	
A911 is not functionally applicable to this system.						
A912	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A913	1	Valve, Manual	2 in., shutoff	Vacco P/N M-6P-X469-2G	10428530	
A914	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A915	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N M-6P-X469-2G	10428544	
A916	1	Valve, Manual	2 in., shutoff	Vacco P/N M-6P-X469-2G	10428530	
A917	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428835	
A918	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A919 is not functionally applicable to this system.						

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A920	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A921 is not functionally applicable to this system.						
A922	1	Valve, Manual	2 in., shutoff	Vacco P/N M-6P-X469-2G	10428530	
A923	1	Valve, Manual	1/4 in., gage shutoff	Vacco P/N NV-6P-401B-2M	10428535	
A924	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A925	1	Valve, Check	1/4 in., cracking pressure 2 to 4 psig	Security Valve Co. P/N 33860-1	10428598	
A926	1	Valve, Manual	1/4 in., vent	Vacco P/N NVA-6P-401-2G	10428554	
A927	1	Valve, Manual	NC, drain			
A928	1	Valve, Manual	Shutoff		Part of 10428600	
A929	1	Valve, Manual	Shutoff		Part of 10428600	
A930	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication		Part of 10428600	
A931	1	Desiccant Holder	Hydrocarbon removal, 10 microns		Part of 10428600	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A932	1	Valve, Manual	Drain		Part of 10428600	
A933	1	Valve, Manual	Drain		Part of 10428600	
A934	1	Desiccant Holder	Hydrocarbon removal, 10 microns		Part of 10428600	
A935	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication		Part of 10428600	
A936	1	Valve, Check			Part of 10428600	
A937	1	Valve, Check			Part of 10428600	
A938	1	Valve, Solenoid	NC		Part of 10428601	
A939	1	Valve, Solenoid	NC		Part of 10428601	
A940	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication		Part of 10428601	
A941	1	Desiccant, Holder	Water vapor removal, 10 micron nominal, 0.05 min	The Pall Co.	Part of 10428601	
A942	1	Desiccant, Holder	Water vapor removal, 10 micron nominal, 0.05 min	The Pall Co.	Part of 10428601	
A943	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication		Part of 10428601	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A944	1	Valve, Check			Part of 10428601	
A945	1	Valve, Check			Part of 10428601	
A946	1	Valve, Manual	1/4 in., vent	Cardair P/N A1-15812		
A947	1	Trap		Cardair P/N AS-30856		
A948	1	Heat Exchanger	1 in. coil, blow-by	Cardair		
A949	1	Valve, Check		Stock No. 16133 Cardair		
A950	1	Valve, Solenoid	NC	Cardair P/N AS-15572		
A951	1	Unloader		Cardair P/N AC-45548-G2		
A952	1	Heat Exchanger	1 in. coil, 1st stage	Cardair		
A953	1	Trap		Cardair P/N AC-45988		
A954	1	Gage, Pressure	0 to 800 psig range	P/N AS-45300		
A955	1	Heat Exchanger	1/2 in. coil, 3rd stage	Cardair		

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A956	1	Trap		Cardair P/N AC-45990		
A957	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Cardair P/N AS-45302		
A958	1	Valve, Check	1/4 in., cracking pressure 2 to 4 psig	Security Valve Co. P/N 33860-1	10428598	
A959	1	Valve, Manual	1/4 in., vent	Vacco P/N NVA-6P-401-2G	10428554	
A960	1	Valve, Manual	3/4 in., shutoff	Vacco P/N M-6P-X464-2G	10428533	
A961	1	Valve, Check	3/8 in., cracking pressure 2 to 4 psig	Security Valve Co. P/N 33860-1	10428549	
A962	1	Gage, Pressure	0 to 300 psig range; 120 psig normal indication	Cardair P/N AS-45299		
A963	1	Gage, Pressure	0 to 16,000 psig range; 6000 psig normal indication	Cardair P/N AS-45406		
A964	1	Regulator, Pressure	Cracks at 3500 psig; fully open at 6000 psig	Cardair P/N 35100041		
A965 is not functionally applicable to this system.						
A966	1	Valve, Manual	3/4 in., shutoff	Cardair P/N AS-30700		
A967	1	Valve, Manual	3/4 in., vent	Cardair P/N AS-30700		

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A968	1	Filter	7 to 10 microns	Cardair P/N AC-46203		
A969	1	Desiccant Holder	Moisture removal	Cardair P/N AS-45456		
A970	1	Separator, Mechanical	Water and oil removal	Cardair P/N AS-45984		
A971	1	Valve, Manual	3/4 in., shutoff	Cardair P/N AS-30700		
A972	1	Gage, Pressure	0 to 16,000 psig range; 6000 psig normal indication	Cardair P/N 45406		
A973	1	Switch, Pressure	Actuates at 6400 psig	Cardair P/N AS-45299		
A974	1	Trap		Cardair P/N AC-45991		
A975	1	Heat Exchanger	3/4 in., coil, 4th stage	Cardair		
A976	1	Gage, Pressure	0 to 3000 psig range	Cardair P/N AS-45301		
A977	1	Trap	Interstage oil	Cardair P/N AC-45989		
A978	1	Heat Exchanger	3/4 in., 2nd stage	Cardair		
A979	1	Compressor, Helium	120 to 6000 psig, 150 scfm, four-stage	Cardair P/N AE-45980		

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A980	1	Motor,	100 hp	Cardair P/N 71700210		
A981	1	Valve, Solenoid	1-1/2 in., NC	Cardair P/N AS-46000		
A982	1	Trap		Cardair P/N AD-45970		
A983	1	Valve, Manual	1/4 in., NC, vent	Cardair P/N AC-15812		
A984 and A985 are not functionally applicable to this system.						
A986	1	Gage, Pressure	0 to 300 psig range; 120 psig normal indication	Cardair P/N AS-46002		
A987	1	Regulator, Pressure	2200 to 120 psig pressure reduction	Cardair P/N AS-46359		
A988	1	Valve, Manual	3/4 in., shutoff	Vacco P/N MA-6P-464-2G	10428552	
A989	1	Valve, Manual	1/4 in., vent	Vacco P/N NVA-6P-401-2G	10428554	
A990	1	Valve, Check	1/4 in., cracking pressure 2 to 4 psig	Security Valve Co. P/N 33860-1	10420598	
A991	1	Coupling, Quick Disconnect		AN815-8C		
A992	1	Gage, Pressure	0 to 5000 psig range; 2200 psig normal indication	Helicoid P/N 3341	10428545	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A993	1	Valve, Manual	1 in., shutoff	Vacco P/N M-6P-X465-2G	10428532	
A994	1	Valve, Check	1 in.	Vacco P/N CVL-6P-X465	10428546	
A995	1	Coupling, Quick Disconnect		AN815-8C		
A996	1	Gage, Pressure	0 to 5000 psig range; 2200 psig normal indication	Helicoid P/N 3341	10428545	
A997	1	Valve, Manual	1 in., shutoff	Vacco P/N M-6P-X465-2G	10428532	
A998	1	Valve, Check	1 in.	Vacco P/N CVL-6P-X465	10428546	
A999	1	Gage, Pressure	0 to 5000 psig range; 2200 psig normal indication	Helicoid P/N 3341	10428548	
A1000	1	Valve, Check	1/4 in., cracking pressure 2 to 4 psig	Security Valve Co. P/N 33860-1	10428598	
A1001	1	Valve, Manual	1/4 in., vent	Vacco P/N NVA-6P-401-2G	10428554	
A1002	1	Valve, Manual	3/4 in., shutoff	Vacco P/N MA-6P-464-2G	10428552	
A1003	1	Regulator, Pressure	2200 to 120 psig pressure reduction	Cardair P/N AS-46359		
A1004	1	Gage, Pressure	0 to 300 psig range; 120 psig normal indication	Cardair P/N AS-46002		

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1005 and A1006		are not functionally applicable to this system.				
A1007	1	Gage, Pressure	0 to 300 psig range; 120 psig normal indication	Cardair P/N AS-45299		
A1008	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Cardair P/N AS-45302		
A1009	1	Trap		Cardair P/N AC-45990		
A1010	1	Heat Exchanger	1/2 in., coil, 3rd stage	Cardair		
A1011	1	Gage, Pressure	0 to 800 psig range	Cardair P/N AS045300		
A1012	1	Trap		Cardair P/N AC-45988		
A1013	1	Heat Exchanger	1 in., coil, 1st stage	Cardair		
A1014	1	Valve, Solenoid	NC	Cardair P/N AS-15572		
A1015	1	Unloader		Cardair P/N AC-45548-G2		
A1016	1	Valve, Check		Cardair P/N 16133		
A1017	1	Heat Exchanger	1 in., coil, blow-by	Cardair		

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1018	1	Trap		Cardair P/N AS-30856		
A1019	1	Valve, Manual	1/4 in., vent	Cardair P/N AC-15812		
A1020	1	Valve, Manual	1/4 in., vent	Cardair P/N AC-15812		
A1021	1	Trap		Cardair P/N AD-45970		
A1022	1	Valve, Solenoid	NC	Cardair P/N AS-46000		
A1023	1	Motor	100 hp	Cardair P/N 71700210		
A1024	1	Compressor	120 to 6000 psig, 150 scfm, four-stage	Cardair P/N AE-45980		
A1025	1	Heat Exchanger	3/4 in., coil, 2nd stage	Cardair		
A1026	1	Trap		Cardair P/N AC-45989		
A1027	1	Gage, Pressure	0 to 3000 psig range	Cardair P/N AS-45301		
A1028	1	Heat Exchanger	3/8 in., coil, 4th stage	Cardair		
A1029	1	Trap		Cardair P/N AC-45991		

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1030	1	Switch, Pressure	Actuates at 6400 psig	Cardair P/N AS-45299		
A1031	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Cardair P/N AS-45406		
A1032	1	Valve, Manual	3/4 in., shutoff	Cardair P/N AS-30700		
A1033	1	Separator, Mechanical	Water and oil removal	Cardair P/N AS-45964		
A1034	1	Desiccant Holder	Moisture removal	Cardair P/N AS-45456		
A1035	1	Filter	7 to 10 microns	Cardair P/N AL-46203		
A1036	1	Valve, Manual	3/4 in., vent	Cardair P/N AS-30700		
A1037	1	Valve, Manual	3/4 in., shutoff	Cardair P/N AS-30700		
A1038 is not functionally applicable to this system.						
A1039	1	Regulator, Pressure	Cracks at 3500 psig; fully open at 6000 psig	Cardair P/N 35100041		
A1040	1	Gage, Pressure	0 to 16,000 psig range; 6000 psig normal indication	Cardair P/N AS-45406		
A1041	1	Valve, Check	3/8 in., cracking pressure 2 to 4 psig	Security Valve Co. P/N 33860-1	10428549	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1042	1	Valve, Manual	3/4 in., shutoff	Vacco P/N M-6P-X464-2G	10428533	
A1043	1	Valve, Manual	1/4 in., vent	Vacco P/N NVA-6P-401-2G	10428554	
A1044	1	Valve, Check	1/4 in., cracking pressure 2 to 4 psig	Security Valve Co. P/N 33860-1	10428598	
A1045 and A1046		are not functionally applicable to this system.				
A1047	1	Valve, Manual	1/4 in., vent	Cardair P/N AC-15812		
A1048	1	Trap		Cardair P/N AS-30856		
A1049	1	Heat Exchanger	1 in., coil, blow-by	Cardair		
A1050	1	Motor	100 hp	Cardair P/N 71700210		
A1051	1	Compressor	120 to 6000 psig, 150 scfm, four-stage	Cardair P/N AE-45980		
A1052	1	Heat Exchanger	1 in., coil, 1st stage	Cardair		
A1053	1	Trap		Cardair P/N AC-45988		
A1054	1	Gage, Pressure	0 to 800 psig range	Cardair P/N AS-45300		

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1055	1	Heat Exchanger	1/2 in., coil, 3rd stage	Cardair		
A1056	1	Trap		Cardair P/N AC-45990		
A1057	1	Gage, Pressure	0 to 10,000 psig range	Cardair P/N AS-45302		
A1058	1	Desiccant Holder	Moisture removal	Cardair P/N AS-45456		
A1059	1	Desiccant Holder	Water and oil removal, 0.3 micron min	Robbins Aviation, Inc. Model RAF-6SP-773 P/N A-803-3-773	10428557	
A1060	1	Desiccant Holder	Water and oil removal, 0.3 micron min.	Robbins Aviation, Inc. Model RAF-6SP-773 P/N A-803-3-773	10428557	
A1061	1	Desiccant Holder	Water and oil removal, 0.3 micron min.	Robbins Aviation, Inc. Model RAF-6SP-773 P/N A-813-3-773	10428557	
A1062 is not functionally applicable to this system.						
A1063	1	Valve, Manual	1 in., shutoff	Vacco P/N M-6P-X466-2G	10428556	
A1064	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A1065	1	Valve, Manual	1 in., shutoff	Vacco P/N M-6P-X466-2G	10428556	
A1066	1	Desiccant Holder	Water and oil removal, 0.3 micron min.	Robbins Aviation, Inc. Model RAF-6SP-773 P/N A-803-3-773	10428557	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1067	1	Desiccant Holder	Water and oil removal, 0.3 micron min.	Robbins Aviation, Inc. Model RAF-6SP-773 P/N A-803-3-773	10428557	
A1068	1	Desiccant Holder	Water and oil removal, 0.3 micron min.	Robbins Aviation, Inc. Model RAF-6SP-773 P/N A-803-3773	10428557	
A1069	1	Desiccant Holder	Water and oil removal, 0.3 micron min.	Robbins Aviation, Inc. Model RAF-6SP-773 P/N A-803-3-773	10428557	
A1070	1	Valve, Manual	1/4 in., vent	Vacco P/N NVA-6P-401-2G	10428554	
A1071	1	Valve, Check	1/4 in., cracking pressure 2 to 4 psig	Security Valve Co. P/N 33860-1	10428598	
A1072	1	Vaporizer	200 gpm	Cosmodyne	10428622	
A1073	1	Valve, Manual	3 in., shutoff	Powell Co.	10428562	
A1074	1	Valve, Manual	1-1/2 in., shutoff	Powell Co.	10428564	
A1075	1	Reservoir	LN_2	Cosmodyne Part of PN 3100900	Part of 10428625	
A1076 through A1078 are not functionally applicable to this system.						
A1079	1	Motor	50 hp	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1080	1	Switch, Temperature	Actuates at 0 F; -75 F to + 225 F range	Cosmodyne Part of P/N 2410000	Part of 10428625	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1081	1	Valve, Check		Cosmodyne Part of P/N 2410000	Part of 10418625	
A1082	1	Valve, Manual	Shutoff	Cosmodyne Part of P/N 2410000	Part of 10428625	
A1083	1	Valve, Relief	Relieves at 6800 psig	Cosmodyne Part of P/N 2410000	Part of 10428625	
A1084	1	Vaporizer	6000 psig, 1000 scfm	Cosmodyne Part of P/N 2410100	Part of 10428625	
A1085	1	Valve, Manual	Vent	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1086 through A1089 are not functionally applicable to this system.						
A1090	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Cosmodyne Part of P/N 2410000	Part of 10428625	
A1091	1	Switch, Pressure	Actuates at 6700 psig	Cosmodyne Part of P/N 2410000	Part of 10428625	
A1092	1	Motor	50 hp	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1093	1	Pump	6000 psig, 1000 scfm	Cosmodyne Part of P/N 3100900	Part of 10428625	
A1094	1	Valve, Relief	Relieves at 150 psig	Cosmodyne Part of P/N 2409800	Part of 10418625	
A1095	1	Valve, Manual	Vent	Cosmodyne Part of P/N 2409800	Part of 10428625	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1096	1	Gage, Pressure	0 to 100 psig range	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1097	1	Valve, Relief	Relieves at 200 psig	Cosmodyne Partof P/N 2409800	Part of 10428625	
A1098	1	Gage, Pressure	0 to 100 psig range	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1099	1	Valve, Manual	Vent	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1100	1	Valve, Manual	Vent	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1101	1	Valve, Manual	1-1/2 in., shutoff	Powell Co. P/N 43121	10428564	
A1102	1	Valve, Manual	1 in., drain	Powell Co. P/N 49008	10428560	
A1103	1	Valve, Manual	2 in., shutoff	Powell Co. P/N 40395	10428561	
A1104	1	Valve, Relief	1 in., relieves at 150 ($\pm$ 10.5) psig	C. M. Bailey Co. P/N 119-1	10428568	
A1105	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Cosmodyne Part of P/N 2410000	Part of 10428625	
A1106	1	Switch, Pressure	Actuates at 6700 psig	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1107	1	Motor	50 hp	Cosmodyne Part of P/N 2409800	Part of 10428625	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1108	1	Pump	6000 psig, 1000 scfm	Cosmodyne Part of P/N 3100900	Part of 10428625	
A1109	1	Valve, Relief	Relieves at 150 psig	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1110	1	Valve, Manual	Vent	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1111	1	Gage, Pressure	0 to 100 psig range	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1112	1	Valve, Relief	Relieves at 200 psig	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1113	1	Gage, Pressure	0 to 100 psig range	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1114	1	Valve, Manual	1-1/2 in. shutoff	Powell Co. P/N 43121	10428564	
A1115	1	Valve, Manual	Drain	Cosmodyne Part of P/N 2409800	Part of 10418625	
A1116	1	Valve, Manual	Vent	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1117	1	Reservoir	LN_2	Cosmodyne Part of P/N 3100900	Part of 10428625	
A1118 through A1121 are not functionally applicable to this system.						
A1122	1	Valve, Manual	Vent	Cosmodyne Part of P/N 2409800	Part of 10428625	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1123	1	Vaporizer	6000 psig, 1000 scfm	Cosmodyne P/N 2410100	Part of 10428625	
A1124	1	Valve, Relief	Relieves at 6800 psig	Cosmodyne Part of P/N 2410000	Part of 10428625	
A1125	1	Valve, Manual	Shutoff	Cosmodyne Part of P/N 2410000	Part of 10428625	
A1126	1	Valve, Check		Cosmodyne Part of P/N 2410000	Part of 10428625	
A1127	1	Switch, Temperature	Actuates at 0 F; -75 F to + 225 F range	Cosmodyne Part of P/N 2410000	Part of 10428625	
A1128	1	Switch, Temperature	Actuates at 0 F; -75 F to + 225 F range	Cosmodyne Part of P/N 2410000	Part of 10428625	
A1129	1	Valve, Check		Cosmodyne Part of P/N 2410000	Part of 10428625	
A1130	1	Valve, Manual	Shutoff	Cosmodyne Part of P/N 2410000	Part of 10428625	
A1131	1	Valve, Relief	Relieves at 6800 psig	Cosmodyne Part of P/N 2410000	Part of 10428625	
A1132	1	Vaporizer	6000 psig, 1000 scfm	Cosmodyne Part of P/N 2410100	Part of 10428625	
A1133	1	Valve, Manual	Vent	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1134 is not functionally applicable to this system.						

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1135	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Cosmodyne Part of P/N 2410000	Part of 10428625	
A1136	1	Switch, Pressure	Actuates at 6700 psig	Cosmodyne Part of P/N 2410000	Part of 10428625	
A1137	1	Motor	50 hp	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1138	1	Pump	6000 psig, 100 scfm	Cosmodyne Part of P/N 3100900	Part of 10428625	
A1139 through A1141 are not functionally applicable to this system.						
A1142	1	Reservoir	LN_2	Cosmodyne Part of P/N 3100900	Part of 10428625	
A1143	1	Valve, Manual	Vent	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1144	1	Valve, Manual	Vent	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1145	1	Valve, Relief	Relieves at 150 psig	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1146	1	Valve, Manual	Vent	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1147	1	Gage, Pressure	0 to 100 psig range	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1148	1	Valve, Relief	Relieves at 200 psig	Cosmodyne Part of P/N 2409800	Part of 10428625	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1149	1	Gage, Pressure	0 to 100 psig range	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1150	1	Tank, Storage	35,000 gallons capacity, LN_2	Pittsburg-Des Moines	10428624	
A1151 through A1156 are not functionally applicable to this system.						
A1157	1	Valve, Manual	Shutoff		Part of 10428264	
A1158	1	Gage, Pressure	0 to 150 psig range; 65 psig normal indication		Part of 10428624	
A1159 and A1160 are not functionally applicable to this system.						
A1161	1	Valve, Manual	2 in., shutoff		Part of 10428624	
A1162 and A1163 are not functionally applicable to this system.						
A1164	1	Valve, Manual	2 in., shutoff		Part of 10428624	
A1165	1	Valve, Manual	3 in., shutoff		Part of 10428624	
A1166 through A1174 are not functionally applicable to this system.						
A1175	1	Strainer	3 in.	Leslie P/N S1176F, Alt. 4	10428578	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1176	1	Strainer	2 in.	Leslie P/N S1176F, Alt. 4	10428565	
A1177	1	Valve, Relief	1 in., relieves at 150 (± 10.5) psig	C. M. Bailey Co. P/N 119-1	10428568	
A1178	1	Valve, Relief	1 in., relieves at 150 (± 10.5) psig	C. M. Bailey Co. P/N 119-1	10428568	
A1179	1	Valve, Manual	3 in., shutoff	Vacco P/N MO2T-F4610	10428577	
A1180	1	Gage, Pressure	0 to 300 psig range; 60 psig normal indication	Helicoid P/N 3341	10428599	
A1181	1	Valve, Relief	1 in., relieves at 150 (± 10.5) psig	C. M. Bailey Co. P/N 119-1	10428568	
A1182	1	Valve, Manual	1 in., vent	Powell P/N 49008	10428560	
A1183	1	Valve, Manual	1 in., vent	Powell P/N 49008	10428560	
A1184	1	Valve, Check	4 in.	Powell P/N K-4795	10428572	
A1185	1	Regulator, Flow	4 in., NC; fully closed at 10 psid, fully open at 15 psid	Annin Co. P/N Model 1560	10428603	
A1186	1	Valve, Manual	Bypass		Part of 10428624	
A1187	1	Valve, Manual	4 in., shutoff		Part of 10428624	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1188	1	Controller, Pneumatic	22 to 85 psig output, proportional to 25 to 100 psig input	Mason-Neilon P/N Model No. 2707	10428602	
A1189	1	Vaporizer	LN_2 tank ullage pressurization		10427318	
A1190	1	Regulator, Flow	1 in., N.O.; fully open at 3 psid, fully closed at 9 psid	Annin Co., Model 1560	10428604	
A1191	1	Valve, Manual	1 in., bypass		Part of 10428624	
A1192	1	Valve, Relief	Relieves at 150 psig		Part of 10428624	
A1193 through A1197 are not functionally applicable to this system.						
A1198	1	Valve, Check	2 in.	Powell Co. P/N 41364	10428570	
A1199 and A1200 are not functionally applicable to this system.						
A1201	1	Valve, Manual	Vent	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1202	1	Valve, Manual	Vent	Cosmodyne P/N 2409800	Part of 10428625	
A1203	1	Gage, Pressure	0 to 100 psig range	Cosmodyne P/N 2409800	Part of 10428625	
A1204	1	Gage, Pressure	0 to 100 psig range	Cosmodyne Part of P/N 2409800	Part of 10428625	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1205	1	Valve, Relief	Relieves at 200 psig	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1206	1	Valve, Manual	Vent	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1207	1	Valve, Relief	Relieves at 150 psig	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1208	1	Pump	6000 psig, 1000 scfm	Cosmodyne Part of P/N 3100900	Part of 10428625	
A1209 through A1211 are not functionally applicable to this system.						
A1212	1	Valve, Manual	Vent	Cosmodyne Part of P/N 2409800	Part of 10428625	
A1213	1	Switch, Pressure	Actuates at 6700 psig	Cosmodyne Part of P/N 2410000	Part of 10428625	
A1214	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Cosmodyne Part of P/N 2410000	Part of 10428625	
A1215 and A1216 are not functionally applicable to this system.						
A1217	1	Valve, Relief	Relieves at 150 ($\pm$ 10.5) psig	C. M. Bailey Co. P/N 119-1	10428568	
A1218	1	Valve, Manual	2 in., shutoff	Powell Co. P/N 40395	10428561	
A1219	1	Valve, Manual	1-1/2 in., shutoff	Powell Co. P/N 43121	10428564	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1220	1	Valve, Manual	1 in., drain	Powell Co. P/N 49008	10428560	
A1221	1	Valve, Manual	3 in., shutoff	Powell Co. P/N 40402	10428562	
A1222 and A1223 are not functionally applicable to this system.						
A1224	1	Valve, Relief	Relieves at 6800 psig	Cosmodyne Part of P/N 2410000	Part of 10428625	
A1225	1	Valve, Manual	Shutoff	Cosmodyne Part of P/N 2410000	Part of 10428625	
A1226	1	Valve, Check		Cosmodyne Part of P/N 2410000	Part of 10428625	
A1227	1	Switch, Temperature	Actuates at 0 F; -75 to 225 F Range	Cosmodyne Part of P/N 2410000	Part of 10428625	
A1228 is not functionally applicable to this system.						
A1229	1	Vaporizer	200 gpm	Cosmodyne	Part of 10428622	
A1230 is not functionally applicable to this system.						
A1231	1	Valve, Relief	4 in., relieves at 125 (± 10.5) psig	C. M. Bailey Co. P/N 122-4	10428579	
A1232	1	Valve, Manual	2 in., vent	Powell Co. P/N 23200	10428584	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1233	1	Transducer, Pressure	0 to 100 psig range	Fairchild Controls Corp P/N 990S50-2	10465306	
A1234	1	Transducer, Temperature	-100 F to + 250 F range	Aero Research P/N T-5215	10465310-3	
A1235	1	Flowmeter	9,000 to 12,000 scfm	Cox Inst. Co. Type 20 Model 192 SCRF	10465307	
A1236	1	Valve, Relief	Relieves at 6400 (± 100) psig	Ladewig Co. P/N 158SFF	10428540	
A1237	1	Valve, Manual	1/2 in., vent	Vacco P/N MA-6P-X463-2G	10428534	
A1238 is not functionally applicable to this system.						
A1239	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428559	
A1240 through A1242 are not functionally applicable to this system.						
A1243	1	Switch, Pressure	Actuates at 50 psid	Barksdale Valves P/N 9653-1-H-D		
A1244	1	Valve, Check	1/4 in., cracking pressure 2 to 4 psig	Security Valve Co.	10428598	
A1245	1	Valve, Manual	1/4 in., vent	Vacco P/N NVA-6P-401-2G	10428554	
A1246	1	Valve, Manual	2-1/2 in., shutoff	Vacco P/N M-6P-X469-2G	10428530	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1247	1	Valve, Relief	Relieves at 6400 (± 100) psig	Ladewig Co. P/N 158SFF	10428540	
A1248	1	Transducer, Pressure	0 to 7000 psig range	Fairchild Controls Model 990S50-2	10465306	
A1249	1	Flowmeter	2000 to 8000 scfm range	Cox Inst. Co., Model 24 SCRF, Model 2-5318G Potter Aero Corp.	10465308	
A1250	1	Valve, Check	2-1/2 in.	Vacco P/N CLV06P-X469	10428537	
A1251	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428559	
A1252	1	Filter	20 microns, 2-1/2 in.	Microporous Filter Div. of Circle Seal	10428543	
A1253	1	Regulator, Pressure	Cracks at 3500 psig; fully open at 6000 psig	Vacco P/N BPR-6P-X469-06	10428582	
A1254	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428559	
A1255	1	Transducer, Temperature	-100 F to + 250 F range	Aero Research P/N T-5215	10465310-1	
A1256	1	Valve, Manual	1/2 in., vent	Vacco P/N MA-5P-X463-2G	10428534	
A1257	1	Valve, Check	3/4 in.	Vacco P/N M-6P-X464-2G	10428533	
A1258	1	Valve, Check	3/4 in., NC, vent		10428533	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1259	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A1260	1	Tank, Storage	6000 psig GN_2 storage, 200 cu ft capacity	A. O. Smith Corp. P/N MV-50717 & MV-50717A	10428621	
A1261	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A1262	1	Gage, Pressure	0 to 5000 psig range; 3500 psig normal indication	Helicoid P/N 3341	10428545	
A1263	1	Valve, Relief	Relieves at 375 (± 100) psig	Ladewig Co. P/N 158SFF	10428541	
A1264	1	Valve, Manual	1 in., shutoff	Vacco P/N M-6P-X465-2G	10428539	
A1265	1	Valve, Check	1/2 in. cracking pressure, 5 psig maximum	Security Valve Co. P/N A1127-1	10428539	
A1266	1	Valve, Manual	1/2 in., vent	Vacco P/N MA-6P-X463-2G	10428534	
A1267	1	Regulator, Pressure	6000 to 3500 psig pressure reduction	Vacco P/N DL6P3-X465	10428542	
A1268	1	Valve, Manual	1 in., shutoff	Vacco P/N M-6P-X465-2G	10428544	
A1269	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A1270	1	Valve, Relief	Relieves at 6400 (± 100) psig	Ladewig Co. P/N 158SFF	10428540	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1271 is not functionally applicable to this system.						
A1272	1	Valve, Manual	1-1/2 in., shutoff	Vacco P/N M-6P-X467-2G	10428531	
A1273	1	Transducer, Temperature	-100 F to 250 F	Vacco P/N M-6P-X467-2G	10428531	
A1274	1	Transducer, Pressure	0 to 7000 psig range	Fairchild Controls Corp. Model 990S50-2	10465306	
A1275	1	Valve, Manual	1/2 in., vent	Vacco P/N MA-6P-X463-2G	10428534	
A1276	1	Valve, Check	1/2 in. cracking pressure 5 psig maximum	Security Valve Co. P/N A1127-1	10428539	
A1277	1	Valve, Relief	Relieves at 6400 (± 100) psig	Ladewig Co. P/N 158SFF	10428540	
A1278	1	Valve, Manual	2-1/2 in., shutoff	Vacco P/N M-6P-X469-2G	10428530	
A1279	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A1280	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A1281	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A1282 is not functionally applicable to this system.						

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1283	1	Valve, Manual	1-1/2 in., shutoff	Vacco P/N M-6P-X467-2G	10428531	
A1284	1	Valve, Relief	Relieves at 6400 (± 100) psig	Ladewig Co. P/N 158SFF	10428540	
A1285	1	Valve, Relief	Relieves at 6400 (± 100) psig	Ladewig Co. P/N 158SFF	10428540	
A1286	1	Valve, Check	1/2 in., cracking pressure 5 psig maximum	Security Valve Co. P/N A1127-1	10428539	
A1287	1	Valve, Manual	1/2 in., vent	Vacco P/N MA-6P-X463-2G	10428534	
A1288	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A1289	1	Transducer, Temperature	-100 F to + 250 F	Aero Research P/N T-5215	10465310	
A1290	1	Transducer, Pressure	0 to 7000 psig range	Fairchild Controls Corp. Model 990550-2	10465306	
A1291	1	Gage, Pressure	0 to 10,000 psig range, 6000 psig normal indication	Helicoid P/N 3341	10428544	
A1292	1	Sampling Point		AN 814-4C		
A1293	1	Valve, Check	2-1/2 in.	Vacco P/N CLV-6P-X469	10428537	
A1294	1	Switch, Differential Pressure	Actuates at 50 psid	Barksdale Valves P/N 9653-1-H-D		
A1295	1	Valve, Manual	2-1/2 in.	Vacco P/N M-6P-X469-2G	10428530	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1296	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A1297	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A1298	1	Valve, Manual	2-1/2 in., shutoff	Vacco P/N M-6P-X469-2G	10428530	
A1299	1	Switch, Differential Pressure	Actuates at 50 psid	Barksdale Valves P/N 9653-1-H-D		
A1300	1	Valve, Check	2-1/2 in.	Vacco P/N CLV-6P-X469	10428537	
A1301 is not functionally applicable to this system.						
A1302	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A1303	1	Filter	20 microns	Microporous Filter Div. of Circle Seal P/N F-4297	10428543	
A1304	1	Valve, Relief	Relieves at 6400 (± 100) psig	Ladewig Co. P/N 158SFF	10428540	
A1305	1	Valve, Manual	1/2 in., vent	Vacco P/N MA-6P-X463-2G	10428534	
A1306	1	Valve, Check	1/2 in., cracking pressure 5 psig max.	Security Valve Co. P/N A1127-1	10428539	
A1307	1	Valve, Manual	1/2 in., vent	Vacco P/N MA-6P-X463-2G	10428534	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1308	1	Valve, Check	1/2 in., cracking pressure 5 psig max.	Security Valve Co. P/N A1127-1	10428539	
A1309	1	Filter	20 microns	Microporous Filter Div. of Circle Seal P/N F-4297	10428543	
A1310	1	Valve, Relief	Relieves at 6400 (± 100) psig	Ladewig Co. P/N 158SFF	10428540	
A1311	1	Tank, Storage	6000 psig He storage; 200 cu ft capacity	A. O. Smith Corp P/N MV-50717 & MV-50717A	1042861	
A1312	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A1313	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A1314	1	Valve, Check	3/4 in.	Vacco P/N CLV-6P-X464	10428538	
A1315	1	Valve, Check	3/8 in., cracking pressure 5 psig	Security Valve Co. P/N 33860-1	10428549	
A1316	1	Valve, Manual	3/4 in., shutoff	Vacco P/N M-6P-X464-2G	10428553	
A1317	1	Valve, Manual	1/4 in., vent	Vacco P/N NVA-6P-401-2G	10428554	
A1318	1	Valve, Check	1/4 in., cracking pressure 2 to 4 psig	Security Valve Co. P/N 33860-1	10428598	
A1319	1	Gage, Pressure	0 to 16,000 psig range; 6000 psig normal indication	Cardair P/N AS-45406		

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1320	1	Regulator, Pressure	Cracks at 3500 psig; fully open at 6000 psig	Cardair P/N 35100041		
A1321 is	not functionally applicable to this system.					
A1322	1	Gage, Pressure	0 to 300 psig range; 120 psig normal indication	Cardair P/N AS-45399		
A1323	1	Valve, Solenoid	NC	Cardair P/N AS-15572		
A1324	1	Unloader		Cardair P/N AC-45548-G2		
A1325	1	Valve, Check		Cardair Stock No. 16133		
A1326	1	Valve, Relief	Relieves at 6400 ($\pm$ 100) psig	Ladewig Co. P/N 158SFF	10428540	
A1327	1	Valve, Relief	Relieves at 6400 ($\pm$ 100) psig	Ladewig Co. P/N 158SFF	10428540	
A1328	1	Valve, Check	3/8 in., cracking pressure 2 to 4 psig	Security Valve Co. P/N 33860-1	10428549	
A1329	1	Valve, Manual	3/8 in., vent	Vacco P/N NVA-6P-462-2G	10428553	
A1330	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428559	
A1331	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428559	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1332	1	Filter	20 microns	Microporous Filter Div. of Circle Seal P/N 40842	10428559	
A1333	1	Regulator, Pressure	Cracks at 3500 psig; fully open at 6000 psig	Vacco P/N BPR 6P-X466-04	10428581	
A1334	1	Valve, Manual	1 in., shutoff	Vacco P/N M-6P-X466-2G	10428556	
A1335	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428559	
A1336	1	Transducer, Temperature	-100 to + 250 F range	Aero Research P/N T-5215	10465310-2	
A1337	1	Flowmeter	200 to 600 scfm range	Cox Inst. Div. Model 12 SCRF	10465309	
A1338	1	Transducer, Pressure	0 to 7000 psig range	Fairchild Controls Model P/N 990S50-2	10465306	
A1339	1	Valve, Relief	Relieves at 6400 (± 100) psig	Ladewig Co. P/N 158SFF	10428540	
A1340	1	Valve, Manual	3/8 in., vent	Vacco P/N NVA-6P-462-2G	10428553	
A1341	1	Valve, Check	3/8 in., cracking pressure 2 to 4 psig	Security Valve Co. P/N 33860-1	10428549	
A1342	1	Valve, Manual	3/8 in., vent	Vacco P/N NVA-6P-462-2G	10428553	
A1343	1	Valve, Check	3/8 in., cracking pressure 2 to 4 psig	Security Valve Co. P/N 33860-1	10428549	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1344 and A1345 are not functionally applicable to this system.						
A1346	1	Valve, Manual	1 in., shutoff	Vacco P/N M-6P-X466-2G	10428556	
A1347	1	Valve, Check	1/4 in., cracking pressure 2 to 4 psig	Security Valve Co. P/N 33860-1	10428554	
A1348	1	Valve, Manual	1/4 in., vent	Vacco P/N NVA-6P-401-2G	10428554	
A1349	1	Holder, Desiccant	Water and oil removal, 0.3 microns min	Robbins Aviation, Inc. Model RAF-6SP-773 P/N A-803-3-773	10428557	
A1350	1	Valve, Manual	1 in., shutoff	Vacco P/N M-6P-X466-2G	10428556	
A1351	1	Valve, Check	1 in.	Vacco P/N CVL-6P-X466		
A1352 is not functionally applicable to this system.						
A1353	1	Valve, Manual	3/4 in., shutoff	Vacco P/N MA-6P-464-2G	10428552	
A1354	1	Valve, Manual	1/4 in., vent	Vacco P/N NVA-6P-401-2G	10428554	
A1355	1	Valve, Check	1/4 in., cracking pressure 2 to 4 psig	Security Valve Co. P/N 33860-1	10428598	
A1356	1	Gage, Pressure	0 to 5000 psig range; 2200 psig normal indication	Helicoid P/N 3341	10428548	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1357	1	Valve, Relief	Relieves at 2800 (± 100) psig	Ladewig Co. P/N 158SFF	10428550	
A1358	1	Filter	20 microns	Microporous Filter Div. of Circle Seal	10428547	
A1359	1	Valve, Manual	1/4 in., vent	Vacco P/N NV-6P-4018-2M	10428535	
A1360	1	Valve, Check	1/4 in., cracking pressure 2 to 4 psig	Security Valve Co. P/N 33860-1	10428598	
A1361	1	Valve, Check	1 in.	Vacco P/N CVL-6P-X465	10428546	
A1362	1	Valve, Manual	1 in., shutoff	Vacco P/N M-6P-X465-2G	10428532	
A1363	1	Coupling, Quick-Disconnect		AN 815-8C		
A1364	1	Gage, Pressure	0 to 5000 psig range; 2200 psig normal indication	Helicoid P/N 3341	10428545	
A1365	1	Regulator, Pressure	2200 to 120 psig pressure reduction	Cardair P/N AS-46359		
A1366	1	Gage, Pressure	0 to 300 psig range; 120 psig normal indication	Cardair P/N AS-46002		
A1367	1	Valve, Manual	1/4 in., vent	Cardair P/N C-15812		
A1368	1	Trap		Cardair P/N AD-45970		

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1369	1	Valve, Solenoid	1-1/2 in., 2-way, NC	Cardair P/N AS-4600		
A1370	1	Heat Exchanger	3/4 in., coil, 2nd stage	Cardair		
A1371	1	Trap		Cardair P/N AC-45989		
A1372	1	Gage, Pressure	0 to 3000 psig range	Cardair P/N AS-45301		
A1373	1	Heat Exchanger	3/4 in., coil, 4th stage	Cardair		
A1374	1	Gage, Pressure	0 to 16,000 psig range; 6000 psig normal indication	Cardair P/N AS-45406		
A1375	1	Valve, Manual	3/4 in., shutoff	Cardair P/N AS-30700		
A1376	1	Trap		Cardair P/N AC-45991		
A1377	1	Switch, Pressure	Actuates at 6400 psig	Cardair P/N AS-45299		
A1378	1	Separator, Mechanical	Water and oil removal	Cardair P/N AS-45984		
A1379	1	Filter	7 to 10 microns	Cardair P/N AC-46203		
A1380	1	Valve, Manual	3/4 in., vent	Cardair P/N AS-30700		

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1381	1	Valve, Manual	3/4 in., shutoff	Cardair P/N AS-30700		
A1382	1	Valve, Manual	2 in., shutoff	Vacco P/N M-6P-X464-2G	10428530	
A1383	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A1384	1	Valve, Check	1/2 in., cracking pressure 5 psig max.	Security Valve Co. P/N A1127-1	10428539	
A1385	1	Valve, Manual	1/2 in., vent	Vacco P/N MA-6P-X463-2G	10428534	
A1386	1	Valve, Check	1/2 in., cracking pressure 5 psig max.	Security Valve Co. P/N A1127-1	10428539	
A1387	1	Valve, Manual	1/4 in., shutoff	Vacco P/N NVA-6P-401-2G	10428554	
A1388	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Helicoid P/N 3341	10428544	
A1389	1	Valve, Check	2 in.	Vacco P/N CVL-02P-F468	10428583	
A1390	1	Valve, Check	1/2 in., cracking pressure 5 psig max.	Security Valve Co. P/N A1127-1	10428539	
A1391 and A1392		are not functionally applicable to this system.				
A1393	1	Switch, Pressure	Actuates at 50 psid	Barksdale Valves P/N 9653-1-H-D		

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1394	1	Switch, Pressure	Actuates at 50 psid	Barksdale Valves P/N 9653-1-H-D		
A1395 and A1396		are not functionally applicable to this system.				
A1397	1	Valve, Check		Cardair P/N 161568		
A1398	1	Valve, Check		Cardair P/N 161568		
A1399	1	Valve, Check		Cardair P/N 161568		
A1400	1	Desiccant, Holder	Moisture removal	Cardair P/N AS-45456		
A1401	1	Desiccant, Holder	Moisture removal	Cardair P/N AS-45456		
A1402	1	Desiccant, Holder	Moisture removal	Cardair P/N AS-45456		
A1403	1	Valve, Relief	Relieves at 435 psig	Cardair		
A1404	1	Valve, Relief	Relieves at 435 psig	Cardair		
A1405	1	Valve, Relief	Relieves at 1400 psig	Cardair		
A1406	1	Valve, Relief	Relieves at 1400 psig	Cardair		

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1407	1	Valve, Relief	Relieves at 4300 psig	Cardair		
A1408	1	Valve, Relief	Relieves at 4300 psig	Cardair		
A1409 and A1410 are not functionally applicable to this system.						
A1411	1	Valve, Relief	Relieves at 435 psig	Cardair		
A1412	1	Valve, Relief	Relieves at 1400 psig	Cardair		
A1413	1	Valve, Relief	Relieves at 4300 psig	Cardair		

SECTION 3

MECHANICAL SCHEMATICS

This section contains mechanical schematics that identify, by finding number, all of the nitrogen and helium storage facility components that function during a normal countdown sequence.

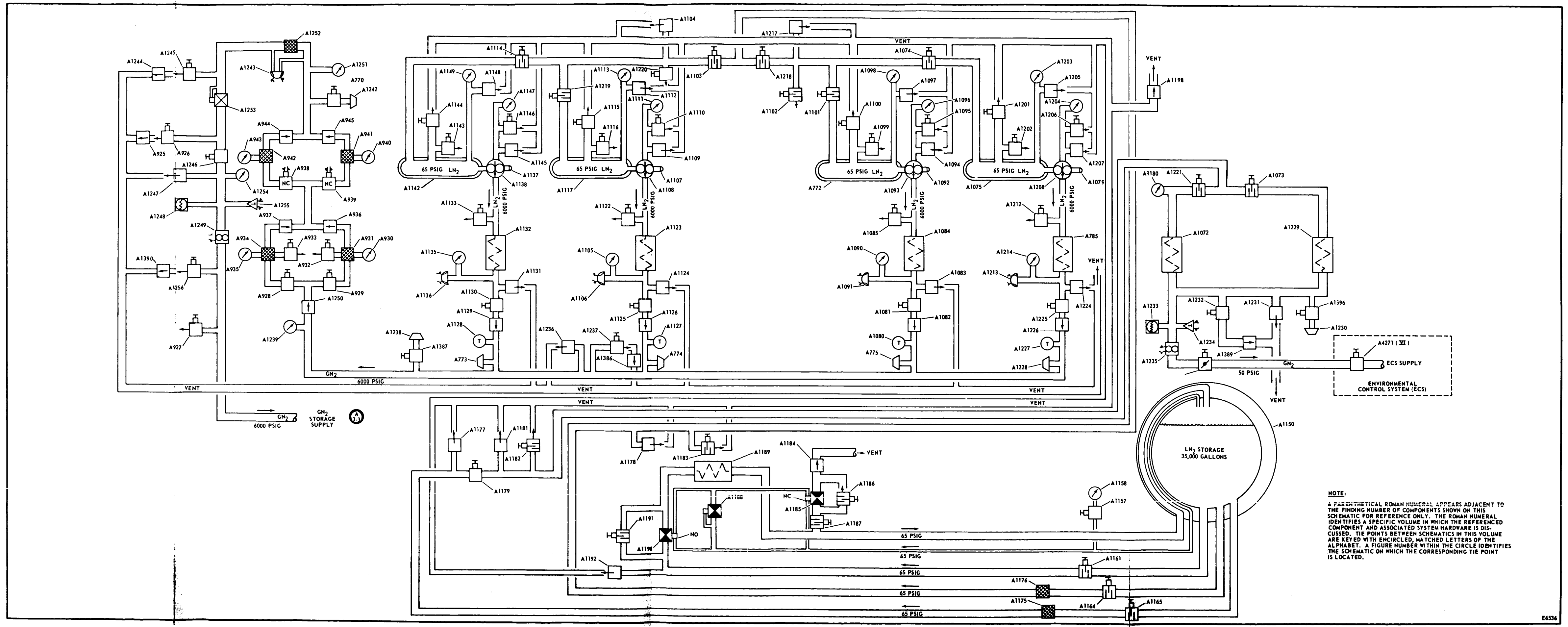

Figure 3-1. Liquid Nitrogen Storage and Nitrogen Compressor Facility

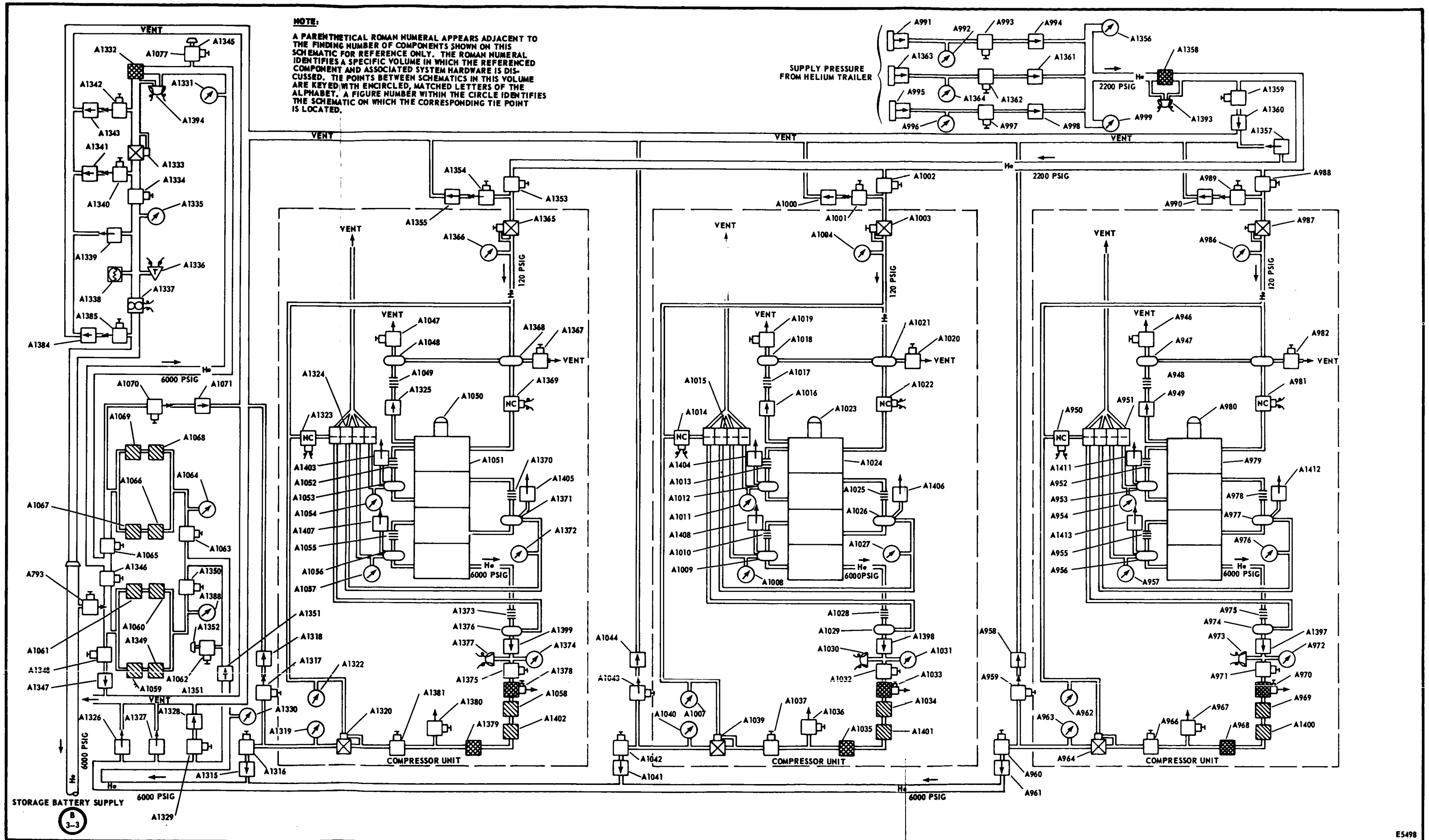

Figure 3-2. Helium Compressor Facility

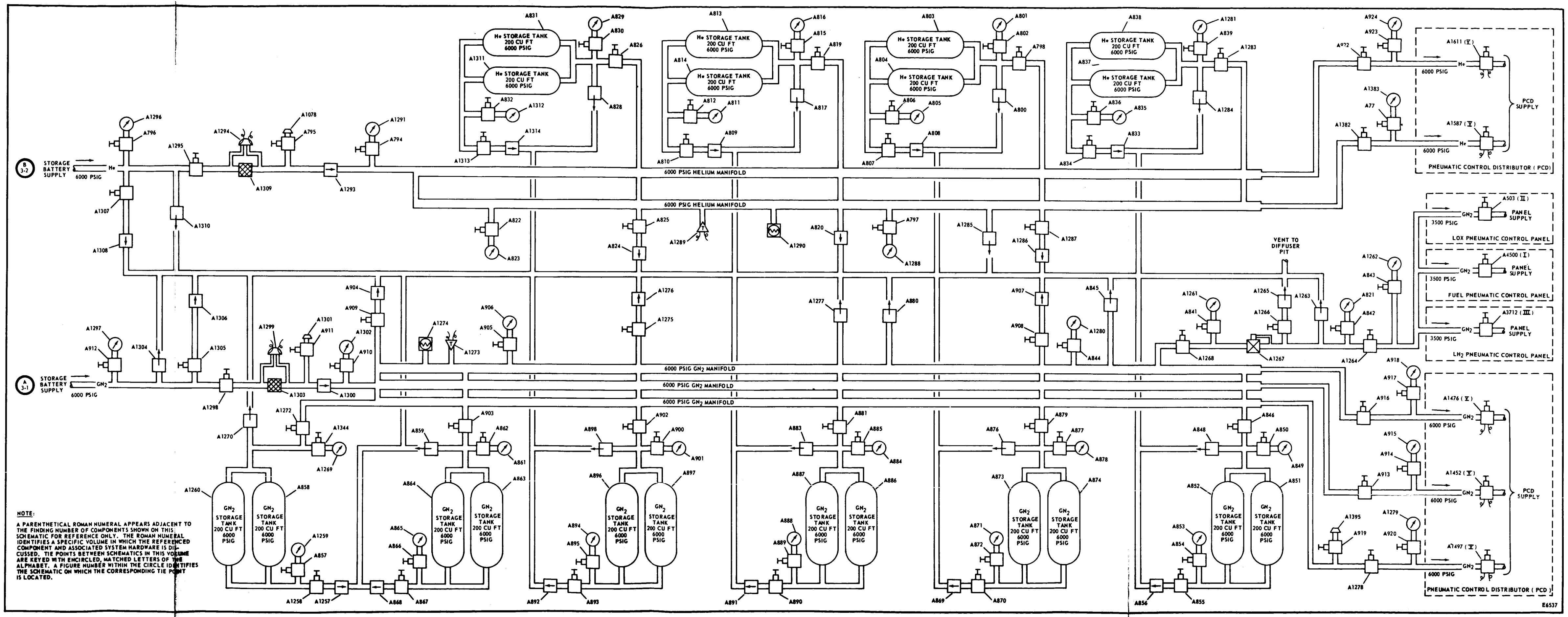

Figure 3-3. Nitrogen and Helium Storage

APPENDIX A

LISTING OF LAUNCH VEHICLE SA-8 AND LAUNCH COMPLEX 37B VOLUMES

Volume	Title
I.	RP-1 Fuel System
II.	LOX System
III.	LH_2 System
IV.	Nitrogen and Helium Storage Facility
V.	Pneumatic Distribution System
VI.	Environmental Conditioning Systems
VII.	Launch Pad Accessories
VIII.	H-1 Engine and Hydraulic System
IX.	RL10A-3 Engine and Hydraulic System
X.	Separation and Flight Termination Systems